Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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JOHN L. FARLEY, Director

Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

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The abstracts in this leaflet may be left in their present form; but it is suggested that to make the most efficient use of them, they be cut out on the lines designated and filed by the number in the upper left-hand corner of each. For a full description of this filing system see "Fishery Technological Abstract Card System" by Maurice E. Stansby and K. L. Osterhaug, Fishery Leaflet No. 232, obtainable free by request from Fish and Wildlife Service, Washington 25, D. C.

In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0	General and theoretical	5	Vitamins
1	Fish by species	6	Fishery byproducts
2	Fresh fish	7	Analytical Methods
3	Preserved fish	8	Composition
4	Oils	9	Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1953

1.71 DOGFISH DEMAND GOOD

Anonymous
Commercial Fisheries Review 17, 71, 72 (November 1955)

A slow but steady increase in the demand for dogfish during the years since the second world war has resulted in a prolonged season according to "Fishing News", a British fishery magazine. The January-August, 1955 catch totaled 14.3 million pounds, valued at £ 244,353 ($648,188), making a worthwhile contribution to British fish landings.

The big increase in demand, which has become more marked during the past year, may be traced largely to London and the Home Counties where the taste for dogfish has grown steadily. One of the reasons may be that during the war many fish friers used dogfish when supplies of other fish were scarce, and so a preference for dogfish to cod, haddock, or skate was developed.

Prospects for an even bigger demand for the once despised dogfish are good, and the wholesale trade is encouraging its marketing potentialities.

ABSTRACTER: Kathryn L. Osterhaug

1.9 STUDIES ON THE NUTRITIVE VALUE OF THE MEAT OF SEA CUCUMBER (STICHOPUS JAPONICUS SELENKA)

Tanikawa, Eiichi; Akiba, Minoru; Yoshitani, Setsuko; Ishiko, Hirotoshi; Motohiro, Terushige; and Wakasa, Tetsuro
Bulletin of the Faculty of Fisheries, Hokkaido University 5, 338, 341, 346, 348 (February 1955); and 6, 42, 49 (May 1955) (In English)

The meat of the sea cucumber contains 85 to 90 percent water, 6.5 to 7.7 percent protein, 0.8 to 1.4 percent fat, and 1.4 to 2.7 percent ash. The meat is about 63 percent digestible.

I. General Introduction and Explanation of Plan of Investigations

II. Seasonal Changes of Chemical Components of the Meat of Stichopus japonicus

III. A Comparison of the Chemical Components of the Meat of Sea Cucumber with the Meat of Other Marine Animals

IV. Digestibility of Meat of Sea Cucumber

V. Nitrogen Distribution and Amino Acid Composition of Protein of Meat of Stichopus japonicus

VI. Nitrogen Distribution and Kind of Chemical Components of the Extractives of the Meat and Skin Parts of Stichopus japonicus

VII. Inorganic Matter in the Meat of Stichopus japonicus

Reprinted in part

1.86 CRAB-MEAT PACKING SANITATION

Anonymous
Commercial Fisheries Review 17, 39-41 (June 1955)

During the summer of 1953 several cases of food poisoning were reported along the Atlantic Coast, presumably due to crab meat. The markets most involved were Baltimore, New York City, and Philadelphia.

At the request of New York City authorities, U. S. Food and Drug Administration sent inspectors and technicians to Florida to find the cause of the trouble and to establish corrective measures. The result was that New York City amended the Crabmeat Regulations of their health code, effective January 1, 1955, by specifying the two groups of crab meat acceptable for entry into the city: (a) crab meat packed in hermetically sealed containers and then sterilized, (b) crab meat prepared, processed, and packed in a plant under permit of a Federal or State inspection service approved by New York City's Department of Health. In addition, maximum bacterial contamination limits have been set as follows:

100 hemolytic (Staphyloccus aureus) per gram of meat
100 coliform organisms per gram of meat
1,000 enterococcus organisms per gram of meat
100,000 total bacterial count per gram of meat

Packers not meeting these qualifications could not ship crab meat into New York City.

As a result of the efforts of the various groups involved, industry has become sanitation and quality conscious. Running a sanitary plant is a full-time job and the direct responsibility of industry.

ABSTRACTER: Max Patashnik

2.1121 "TRAWL-TOAD" DEVISED FOR MID-WATER TRAWL

Anonymous
Commercial Fisheries Review 17, 66-68 (November 1955)

In the tests that produced the phantom trawl in 1944, tank tests demonstrated that approximately two-thirds of the resistance of a normal bottom trawl came from the net, the rest from the warps and doors.

It was found possible to design and build trawl doors that could move in the water without touching the sea bed. An ordinary rectangular flat trawl door is, from a hydrodynamic point of view, of very poor design as it causes much resistance and noise. To rectify these flaws, the wingdoor with an angle of less than 15 degrees from the direction of motion and giving a steady and practically sound-less movement was developed.

After the wingdoor had been developed, it was found that the glass ball floats increased in resistance and decreased in lifting power as the towing speed increased. At a little more than four knots the resistance of 8-inch balls was 13.2 pounds. This pointed up the necessity for some kind of lifting device with better characteristics than the balls.

The "trawl-toad" was developed in answer to this need. Several years and much experimentation was necessary for the perfection of this device.

Today a "trawl-toad" 15.7 inches long, weighing 5.5 pounds, increases its shearing capacity according to the square of the speed and at four knots reaches between 26 and 33 pounds. The upper trawl-toad for the headline is lighter than water to keep clear of the top of the net when shooting. If the "toad" is heavier than water, it will drag downwards. Thus, trawl-toads can be used both on headlines and foot ropes, giving a very good height to the mouth of the net. The upper trawl-toad can, of course, be used on any kind of bottom trawl to increase the height of the mouth and enlarge the fishing capacity of the net.

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ABSTRACTER: Kathryn L. Osterhaug

DOGFISH IN DEMAND

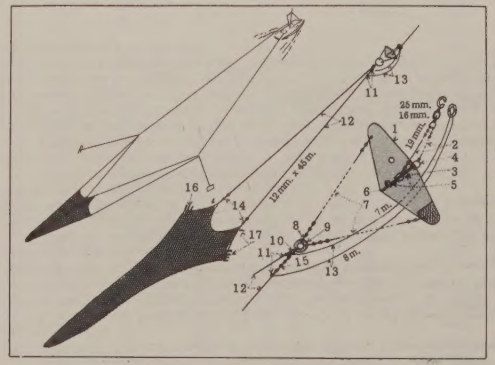
CRAB-MEAT SANITATION

NUTRITIVE VALUE OF SEA CUCUMBER

"TRAWL-TOAD" DEVISED

1.86

2.1121



(1) Wingdoor with fixed fittings.
(2) Chain-bridle, 19 and 16 mm.
(3) Harp-shackle, 25 mm. special type.
(4) Harp-shackle, 22 mm. special type.
(5) Pulling plate. (6) Pulling bolt with leather strap. (7) Pullingchain, 16 mm. x 3 metres. (8) D-shackle, 19 mm. special type. (9) Depth regulating ring. (10) D-shackle, 25 mm. standard. (11) Kelly's eye with stopper. (12) Pulling wire, 12 mm. x 45 metres. (13) Wire for hauling in, 12 mm. x 7 and 8 metres. (14) Swivel, 20 mm. (15) Chain for lengthening pulling wire, 16 mm. x 800 mm. (16) Upper trawl-toad. (17) Lower trawl-toad.
(British Patents No. 67022 and 674911: U. S. Patents 24664660 and 2671288).

1.71

1.9 (Cross Reference: 2.9)

2.1121 CANADIAN MID-WATER HERRING TRAWL (2)

Barraclough, W. E. and Johnson, W. W. (Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, B. C., Canada)
World Fishing 4, 26-30 (September 1955)

In the construction of the herring trawl "zipper" the starting point was on the upper starboard side of the cod-end. Two 36-foot, 5/16-inch braided nylon ropes extending backward (one of which is the rib-line along the seam) with 1 1/4-inch rings fastened abreast of each other 18 inches apart, form the sides. A similar rope threaded through the rings was used to close the "zipper".

The four triangular wings were built from 5-inch no. 93-thread nylon web, and each measured 75 meshes high and 150 meshes along the base. Beginning at the center of each wing base they were laced mesh for mesh to the net body by starting at the corner seam and working toward the square. The square, which is the section of net between the two wings, measured 16 feet on all four sides. Then rib-lines of 5/16-inch braided nylon rope were properly laced along the seams of the net and extended to the apex of the wings in order to prevent damage to the net while under tension in the water. For the same reason it is important that a short, similar rope be laced down the net at the points where the wings and the square terminate.

A combination manila and 6-strand wire-rope (Belflex cable) 9/16 inches in diameter was used for head-ropes. The wings and square of the net were hung directly to this line, however, taking three wing meshes for a selvedge shortened the wing length to 29 3/4 feet and the 150 meshes of the body hung 1 1/4 inches apart form the 16-foot long square. The "Belflex" head-rope extended 3 feet beyond the wing tips and ended in an eye-splice in order that the shackles for the sweep-lines would be clear of the netting. The 1/2-inch nylon lead-line weighed about 25 pounds and was lashed to the "Belflex" lead-line beginning at a point 1 1/2 fathoms from the tip of one wing and extending along the square to the same position on the other wing.

The 11 aluminum planing floats evenly spaced along the "square" of the head-rope increased the normal lifting ability about five times that of aluminum floats without a lifting plane at normal towing

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ABSTRACTER: Harold C. Johnson

2.113 ULTRA-SONICS FOR BARNACLE CONTROL

Anonymous
Fisheries Newsletter (Australia) 14, 13 (December 1955)

Ultra-sonic vibrations are being used with encouraging results to keep the hulls of ships clear of barnacles and other marine pests that add to operating costs. Experiments being conducted by a Birmingham, England paint manufacturer have reached a stage where they may look forward to offering their barnacle-beating device commercially.

It was already known that ultra-sonics are being used to remove weevils from flour and lice from clothing. The use on barnacles was then a logical extension of the instrument.

The initial experiments took place at Plymouth, England. Two steel plates, each about 6 feet by 3 feet were submerged for a period. One of the steel plates was continuously treated ultrasonically by the magneto-striction method. When they were lifted out of the water, the ordinary plate was seriously fouled, but the treated plate showed very little fouling.

The next step was to fit an ultra-sonic instrument to a ship and see what would happen. The first ship to be fitted was the Cunarder, Brescia, operating in the Mediterranean. She returned very clean from her next voyage.

Subsequently the Swedic, the 17,000-ton liner, Warwick Castle, and the Soudan, were similarly equipped and the results were good.

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ABSTRACTER: Kathryn L. Osterhaug

2.1121 CANADIAN MID-WATER HERRING TRAWL (3)

Barraclough, W. E. and Johnson, W. W. (Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, B. C., Canada)
World Fishing 4, 34-36, 46 (October 1955)

The net was set at enough distance, ahead of the located school of herring, to allow the gear to acquire the correct depth. At slow speed the cod-end was dumped over the canvas-covered stern (nylon has a tendency to catch very easily on any small projection) and was followed by the body and wings. As the sweep-lines were paid out from the winches the effect of the depressors shackled on the lower lines could be seen on the wing corners. When 20 fathoms of sweep-line were out all the plane-floats were functioning and the mouth of the net opened almost to its full extent. Next, the otter-boards were shackled to the pennants as the latter unwound from the winches together with the sweep-lines. Full speed was used at this point to assist the boards in clearing the stern. After the balance of the sweep-lines were out the vessel cut speed to that required for fishing (about 3 knots).

After some experimenting it was possible to establish a relationship between the observed angle of towing warp and the depth of the bottom of the trawl. It was also determined that the top of the arch of the head-rope was about 40 to 45 feet above the lead-line. The following table may serve as a rough guide for gear of these specifications; however, it should be noted that the amount of towing warp does not include the length of the sweep-lines or the distance from the apex of the wing to the square of the head-rope. The towing speed of about 3 knots varied, particularly when fishing in an ebb or flood tide in the narrow passes, therefore the engine speed was changed to meet the required wire angle of the towing warp.

The speed of the vessel should never be decreased when hauling the gear in relatively shallow water. It was found that the trawl may sink as much as 12 fathoms by reducing the speed 1 knot, hence the danger of tearing the net on the bottom. After all the lines were winched in on the drums, the wings and body were taken aboard in the conventional manner of Pacific Coast rigged trawlers. To

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ABSTRACTER: Harold C. Johnson

2.114 MARINE ENGINES

Gherardi, G. Motori
World Fisheries Abstracts 6, 7 (November-December 1955)

An average wooden trawler of 100 to 300 h.p. with a fuel-carrying capacity of 1,000 to 1,300 gal. (4,546 to 5,910 l.) and an operating range of 14 to 15 days, needs a propulsion unit capable of driving the ship at a maximum free running speed and of developing maximum power while trawling at low speeds. At the International Fishing Boat Congress held in Paris, and Miami, Fla., U.S.A. in 1953, the following methods of dealing with the problem were put forward: (1) the "Father and Son" propulsion unit; (2) variable speed reverse reduction gearing; (3) Diesel-electric propulsion; (4) c.p. propellers, and (5) supercharged engines.

Supercharged engines are the most practical solution known at present; they are simple, economical, robust and fulfill the necessary requirements. The supercharging of 4-stroke marine engines is still more or less experimental. It can be effected either by means of an exhaust gas turbo-charger or by means of a compressor driven by the crankshaft; the former is the more satisfactory. Compared with its unsupercharged counterpart, a supercharged engine weighs about 45 percent less and its overall dimensions are smaller by 40 to 45 percent; the fuel consumption is reduced by 5 percent at full load and 15 percent when partially loaded; up to 30 percent less lubricating oil is used for the same effective horse power; there is no need for silencing; and it burns the same fuel. The cost of a turbo-charger is largely balanced by the reduction in the number of cylinders required for a given power output and, therefore, by reduced running costs and maintenance, since the turbo-charger requires less frequent attention than the cylinders. It is advisable to replace roller bearings after 4,000 hours. About 30 percent of the air from the compressor serves to cool the valves and pistons, and the exhaust gas is discharged at about the same temperature as that of an unsupercharged engine. No special precautions are necessary against racing the turbo-chargers as the compressor

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MID-WATER TRAWL (2)

MID-WATER TRAWL (3)

ULTRA-SONIC BARNACLE CONTROL

SUPERCHARGED ENGINES

2.1121

bring the cod-end alongside the starboard bow, the vessel was reversed slowly. Once in position the front section of the cod-end was "choked off" and the last section lifted clear of the water by the fore-boom. It is very important to now untie the poke string and re-close the cod-end with a strap, for should the herring die quickly and start to sink the strap can be released and the cod-end passed over-board allowing the fish to escape thus preventing the gear from being lost.

The purpose of the "zipper" is to provide an opening in the cod-end through which the herring can be brailed aboard. As soon as the "zipper" was released the inner side was laced to the railing of the boat, the outer edge was immediately laced to the parallel bar which was held in position by the "legaze" pole. Three rings in the front of the "zipper" were left free, permitting the web to spread away from the boat. Before lowering the parallel bar the outrigger pole was lashed at right angles across the after end. At this junction a 5-gallon buoy-keg was made fast to assist in pushing the outrigger pole perpendicular to the vessel. A guy line made fast to the stanchion held the parallel pole and outrigger clear of the water. "Drying up" is the term used in lifting the cod-end up on the fore deck so that the herring are forced into the "zipper" opening where they can be brailed.

Amount of towing warp out (fathoms)	Wire angle on towing warp	Depth at bottom of trawl (fathoms)	Amount of towing warp out (fathoms)	Wire angle on towing warp	Depth at bottom of trawl (fathoms)
25	12°	11.2	100	12°	27
25	13°	11.6	100	13°	28.5
25	14°	12	100	14°	30
25	15°	12.5	100	15°	32
25	16°	13	100	16°	33.5
25	17°	13.3	100	17°	35
50	12°	16.5	125	12°	32
50	13°	17	125	13°	34
50	14°	18	125	14°	36
50	15°	19	125	15°	38
50	16°	20	125	16°	40.5
50	17°	20.5	125	17°	42.5
75	12°	21.5	150	12°	37
75	13°	23	150	13°	39.5
75	14°	24	150	14°	42
75	15°	25.5	150	15°	45
75	16°	26.5	150	16°	47
75	17°	28	150	17°	50

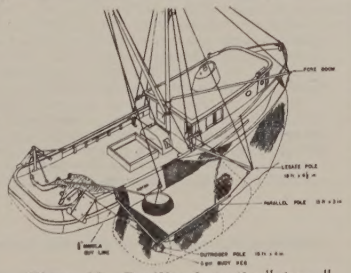

Figure 18. Brailing from the "zipper"

2.114

automatically adjusts itself to the flow of exhaust gases. With a supercharged engine on a fishing vessel, the difficulty experienced with unsupercharged Diesels, of maintaining maximum propeller efficiency, both when running free and when developing high torque at low speeds, does not arise, because the air intake is automatically adjusted to the required load, while combustion and cooling of the cylinders remains satisfactory within wide limits. The rate of supercharging, for example, 50 percent when running free, can, under adverse conditions, rise to as much as 80 percent during trawling without overloading either the engine or the supercharger. Supercharging also provides a reserve of power for emergencies, such as bad weather conditions. The increase in free running speed for a vessel of 90 to 180 tons displacement will be in the neighborhood of 1 1/2 to 2 knots or more. A typical fishing vessel is illustrated with a 200 h. p. motor developing a free running speed of 9 knots in full fishing trim. This vessel could be fitted with a supercharged engine developing 300 h.p. for the same r.p.m. without any modification of engine spaces. The resulting increase in speed in full trim would be about 1 1/2 knots with a corresponding increase in efficiency when trawling.

Principal particulars are given of the deep sea fishing vessels Pietro e Paulo, displacement 74 tons, and Nuova Stella, displacement 196 tons, which are among the first to be fitted with Ansaldo supercharged Diesel.

2.1121

speeds. These "hat-floats" as they are often called, gave adequate buoyancy and it was observed that the head-rope formed a broad upward arch as the net was being towed.

The 4 sweep-lines were of 3/8-inch galvanized wire rope. The top lines were 30 fathoms long and the two lower lines 31 fathoms due to the addition of a fathom of 3/8-inch chain used to make the net tow horizontally through the water. Each sweep-line was coupled to the wing corners with swivels and the upper and lower line from each side were shackled to the receiver-link which was termed the tow-point. Adjustable depressors were designed to slide freely on the lower sweep-lines. These produced a continuous downward thrust to the lower wings yielding a maximum trawl mouth opening and also aided in setting the gear by immediately depressing the lower sweep-lines and lead line.

The specially designed dual-finned otter-boards were built of 3/8-inch thick laminated plywood. They measured 5 1/2 feet long and 3 feet high. The curvature of the boards was held by two bent angle iron strips on the upper and lower edges. The 2 adjustable lower horizontal fins helped in maintaining the correct angle of attack of the boards when towed in the water. Each door was weighted and balanced with various size lead bars totaling 135 pounds. These factors plus the accurate placement of towing lugs and correct length of each section of chain in the bridle are essential for proper otter-board alignment when towed at full or fishing speeds. Pennants of 1/2-inch galvanized wire rope, 10 fathoms long, shackled to the tow-point were used to suspend the otter-boards thus minimizing the disturbance immediately in front of the net.

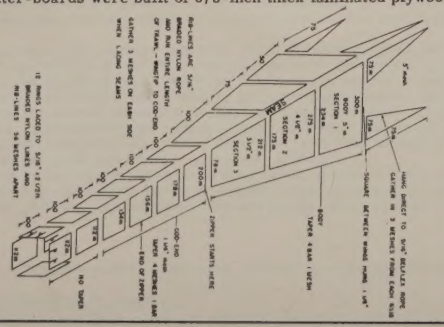

Figure 13. Section View of the Trawl Net

2.113

The ultra-sonic equipment consists of an oscillator and a transducer from which a twin-core wire makes contact with the side of the ship. From that one contact of wire with hull, vibrations of 28 kilocycles per second are sent throughout the entire ship.

How much the equipment will cost when the firm is ready to market it has not yet been worked out.

2.115 THE SEA-GOING REQUIREMENTS OF COMMERCIAL FISHING VESSELS

Minot, Francis (Ocean Resources Institute, Inc., Woods Hole, Massachusetts)
Fishing Gazette 73, 36, 37, 57, 58 (January 1956)

Seaworthiness is of vital importance in fishing vessels for a variety of reasons:

1. The open ocean, where offshore fishing vessels operate, is almost always rough for the small ship.
2. The fishing vessel must provide as steady a platform as possible from which to conduct fishing operations.
3. The fishing vessel must maintain position and continue to fish wherever fish are found as long as wind and sea permit.
4. The fishing vessel must load cargo at sea. If decks are flooded with hatches open, a dangerous volume of water can enter the fish holds and seriously reduce the vessel's stability and buoyancy.
5. The stability of a vessel can be affected adversely by the alterations in displacement and trim caused by conditions of loading, the exchange of fuel and ice for fish, and by occasional heavy icing of rigging and superstructure during winter trips to northern waters.

The problem of seaworthiness in fishing vessels can be worked on from a double approach: on the one hand, the problem is to determine the limiting capabilities of the vessel in weather; and on the other hand, to attempt to raise these limits.

Trawling and trawlers. --Trawling and trawlers represent respectively, probably the most arduous fishing operation and the most seaworthy type of fishing vessel.

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 ABSTRACTER: Kathryn L. Osterhaug

2.116 SOME SIMPLE OCEANOGRAPHICAL INSTRUMENTS TO AID IN CERTAIN FORMS OF COMMERCIAL FISHING AND VARIOUS PROBLEMS OF FISHERIES RESEARCH

Carrothers, J. N. (British National Institute of Oceanography)
FAO Fisheries Bulletin 8, 130-140 (July-September 1955)

At various times and for numerous reasons applications have been received from fishermen for information on currents below the surface water of fishing areas. In an article by J. Eggvin, Head of the Oceanographical Division of the Norwegian Fishery Directorate, it states that the current prevailing at fishing depths often runs in a different direction from that at the surface, also this factor is more pronounced at depths of 90 to 100 meters than at 50 to 60 meters. Eggvin and his associates devised a method of using the Ekman current meter to record currents at various fishing depths. While this apparatus was ideal for use by a research vessel, it was not suited for use by ordinary fishing vessels whose needs were for a simple current-measuring device that could be used without anchoring the boat.

In response to an invitation from the Norwegian Fisheries Directorate, the writer studied the problem in Bergen in 1953 and devised an instrument, the fishermen's cone, which since has undergone many modifications. The cone was tested in many areas and observations of very great interest were made which disclosed considerable changes in speed and direction of currents near the bottom and at various depths.

The fishermen's current cone consists of a casing of perforated plastic-coated aluminum, which can vary its altitude according to the speed and direction of the water flow, and contains a simple mechanism for recording these factors. The cone is swung in trunnions at the end of a fork mounting that terminates in helices. These bear on top of and are held in position by a rope clamp allowing the cone to swing freely around the rope. To obtain the readings from the recording mechanism it is only necessary to compress the spring clamps, thereby setting free the speed pendulum and the compass

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 ABSTRACTER: Harold C. Johnson

2.118 FISHING BOATS - INSTALLATION OF PROCESSING EQUIPMENT - FREEZING

Nitotschkin, A. E. and Bronstein, L. B.
World Fisheries Abstracts 6, 11 (November -December 1955)

This is a German abstract of a Russian article appearing in Rybnoe Khoziastvo (Moscow), No. 7, 1954. A type of freezing equipment which uses $CaCl_2$ brine to freeze fish blocks and is suitable for installation aboard trawlers, is described. The equipment can be used to freeze cod, herring, etc., also for making block ice. It consists of a tank (see over) with 2 rows of 12 freezing containers each, which are attached to a frame that can be swung around by a revolving axle. Through the bearing and stuffing box pass a 50/3.5 mm. (1.97/0.14 in.) tube and the revolving axle to which the frame carrying the freezing containers are attached. The freezing medium, $CaCl_2$, passes through the tube in and out of the tank. The top containers are filled with fish, hermetically sealed by a double-walled cover and the frame rotated by 180°. The bottom containers which now come to the top are filled with fish and sealed. The temperature of the $CaCl_2$ brine is -25° to -26° C. (-13° to -15° F.) and freezing time of fish is 4 to 5 hours. The inner temperature of the frozen fish will be -12° to -15° C. (10.4° to 5° F.). Then the cold brine circulation is shut off and by a supply of warm liquid the frozen fish blocks are detached from the containers. This takes about 3 to 5 minutes. The freezing equipment measures 2 x 1.5 x 0.7 m. (6.5 x 4.9 x 2.3 feet.) occupying a volume of 2.1 m^3 (74.1 cubic feet) and weighs 1 1/2 tons. Each freezing container has a capacity of 48.1 (12.7 gal.) or 38 kg. (83.8 pounds) of cod so that the capacity of the plant is 0.9 tons/batch or 5 tons of fish/24 hours. The advantages of freezing fish in blocks are discussed with particular reference to saving of space occupied by the equipment.

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2.116 (Continued)

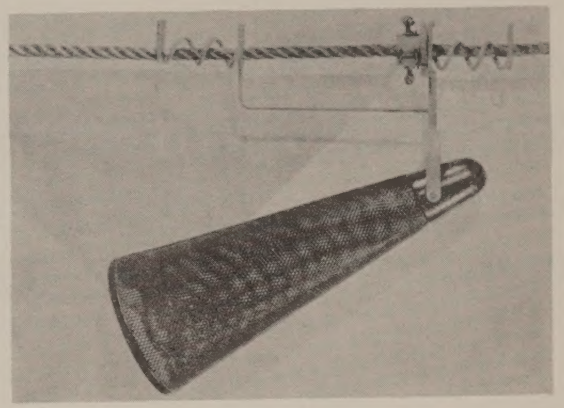


Figure 1. The fishermen's current cone shown attached to a rope and taking up its position at an angle to the vertical as it would in a water current of about 1/2 knot.

IMPROVED VESSEL DESIGN

FISHERMEN'S CURRENT CONE

$CaCl_2$ BRINE FREEZER

FISHERMEN'S CURRENT CONE

2.116

card on the instrument as it is about to be lowered. To hold the spring compressed, a soluble tablet is inserted in a small fork. When the tablet dissolves (15 to 20 minutes), the spring is released locking the compass card and pendulum for a preserved reading when the cone is surfaced. When the cone is lowered, the use of proper weights and floats are important to maintain the right tension at the bottom of the line thereby overcoming excessive slope and yet not dragging the anchor. To check on the height of the cone from the bottom, a method of measuring the slope is desirable.

A device for this purpose is the rope angle gauge. This consists of a pendulum suspended between two leaves of transparent plastic, one of which is engraved with a graduated scale of degrees. This instrument is fixed to the rope by the same method used for the cone and is located midway between it and the anchor. To release and lock the gauge pendulum a soluble tablet is employed in a similar manner as that used for the cone mechanism.

Two forms of perspex-cased rolling clinometers have been constructed, one with, and one without a compass. In this instrument a solidifying gelatine solution replaces the soluble tablet used in the rope angle gauge. In the compass-equipped clinometer the compass is pivoted in the pendulum and is always in a horizontal plane for correct orientation to the earth's magnetic field. The frame in which the pendulum swings is itself able to revolve about the axis of the perspex tube and is provided with two weights compelling it into a vertical plane. When about to be used, the clinometer is plunged into hot water until the inserted gelatine solution is liquified, then the gauge is fixed on the rope by rubber bands. When the rope is hauled, the gelatine will be set thus preserving the readings.

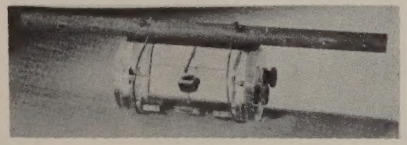


Figure 8. (left) The rope angle clinometer with compass. This view shows the compass card pivoted inside the pendulum. The pendulum is swung between the transparent side plates one of which bears the slope scale. The pivots of the frame and its brass weights at the bottom can be seen.

2.116

2.115

The trawling operation is performed at low speed--3 to 5 knots--though not necessarily at low power, since the added resistance of the trawl gear often requires the use of full power to maintain the necessary trawling speed. When the trawl is hauled aboard, the vessel is brought broadside to wind and sea with little or no forward speed, and the gear is hoisted from a point well up the main mast.

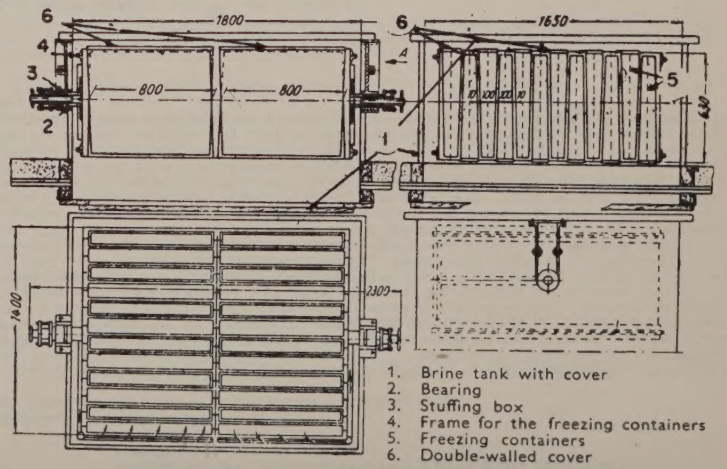
A combination of factors determine the upper limit of speed in heavy weather; for the ship; size, the relation of displacement to length, hull form, and stability; for the sea; the relation of the length and period of the waves to the length and the natural periods of the motions of the ship. The problem is, what can be done to increase the safety and extend the upper limits of operational ability in both trawling and free running conditions?

Improvement of existing vessels is admittedly difficult, but some improvement may be effected. Stability characteristics may be accurately calculated and if advisable, ballast may be added, re-arranged, or reduced. Loading and trim conditions may be improved and watertight integrity insured through well-fitted hatches and other openings.

With new designs there is much more latitude. Small, "fat" vessels with V-type sections in the forebody, ample draft to insure good immersion of the propeller, and a moderate displacement-length ratio have increased seaworthiness and ability to maintain speed in heavy weather. Ample freeboard and reserve buoyancy, particularly in the bow, are desirable. The somewhat conflicting requirements of sufficient transverse stability and easy rolling may soon be realized through the incorporation of such devices as anti-rolling tanks and adjustable fins that will modify rolling without sacrificing stability.

In addition, a rearrangement of conventional loading facilities to improve watertight integrity is most desirable; systems that will obviate the necessity for open hatches at sea would contribute greatly toward increased safety. The problem of devising a subdivision of the hull of a trawler which would afford some protection in the event of flooding or of underwater damage, and yet not interfere with the essential internal arrangements is difficult and perhaps not possible unless the trawler evolves into something quite different from the accepted type.

2.118



1. Brine tank with cover
2. Bearing
3. Stuffing box
4. Frame for the freezing containers
5. Freezing containers
6. Double-walled cover

(Courtesy *Deutsche Fischerei Zeitung*)

2.118 RECENT DEVELOPMENTS IN THE FREEZING OF FISH AT SEA
II. THE QUALITY OF SEA-FROZEN COD.

Banks, A. (Torry Research Station, Aberdeen, Scotland)
Chemistry and Industry No. 43, 1360-1362 (October 22, 1955)

Changes that occur in fish when they are frozen and stored have been studied at Torry Research Station for a number of years; however, many problems still remain for study. These are related to the type, size, and operation of the freezing plant and to the effect of various treatments on the quality of the frozen products.

Factors investigated.--The factors and combinations of factors investigated were as follows: (1) freezing of pre-rigor fish, (2) freezing ungutted fish, (3) freezing fish that have been in ice for different periods, (4) storage temperatures for frozen fish.

About 1 1/2 tons of cod were frozen on board the vessel Keelby and 1 1/2 tons of cod were frozen on shore. These samples were thawed and examined. Some difficulty was encountered because no direct methods are available for the examination of fish. Basically, however, fish that are held too long in ice before freezing and are then frozen and held in storage at too high a temperature will have a poor appearance when thawed. Such fish will be soft to the touch, will have a stale "cold-storage" flavor that is unpleasant, and will produce torn or dull, ragged fillets. All of the samples of frozen fish were judged on the basis of suitability for filleting, transporting, retailing, and smoking. Samples of the frozen fish were cooked, tasted, and compared with samples of cooked fresh fish.

Findings.--The present studies confirm the earlier findings to the effect that fresh fish frozen within a few hours after catching are acceptable for 3 to 4 months if stored at -20° F. Fish held for

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 ABSTRACTER: Martin Heerdt

2.8 HOW TO COOK FROZEN FISH WITHOUT PRETHAWING. PART I - DETERMINATION OF OPTIMUM INTERNAL TEMPERATURE FOR BAKED FROZEN HALIBUT STEAKS

Osterhaug, Kathryn L. and MacFarlane, Marian (Fishery Technological Laboratory, Seattle, Washington)
Commercial Fisheries Review 17, 12-14 (November 1955)

The ultimate objective of the work reported here was to formulate exact instructions for cooking frozen fish without prethawing. As the first objective was to establish a reproducible standard for "doneness" and the accepted reference point for doneness in protein foods is internal temperature, the specific purpose of this work was to establish the optimum internal temperature for baked frozen halibut steaks.

The basic procedure of the experiment consisted of baking frozen halibut steaks to various internal temperatures and having a taste panel evaluate them for palatability.

In the first series of tests, the extreme temperature limits for doneness were established as ranging from approximately 130° to 175° F. Flavor scores were found to be directly proportional to the rise in internal temperature, whereas juiciness and texture scores were inversely proportional to the rise in temperature.

In the second series, the panel members were asked to give a judgment based on the composite effect of flavor, texture, and juiciness rather than to classify their judgments according to these individual palatability components. Enough tests were conducted so that a total of 54 judgments for each temperature range could be collected and the final scores could be analyzed statistically.

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 ABSTRACTER: Kathryn L. Osterhaug

2.19 THE EXPRESSIBLE FLUID OF FISH FILLETS. IV. THE EXPRESSIBLE FLUID OF ICED COD

Banks, A. (Torry Research Station, Aberdeen, Scotland)
Journal of the Science of Food and Agriculture 6, 584-587 (October 1955)

Experimental procedure.--Eviscerated cod were packed in crushed ice immediately after they were caught. Samples of these cod were withdrawn after 18, 48, 68, 168, 264, and 360 hours and filleted. Of the two fillets obtained from each fish, one fillet was pressed and the other was frozen and placed in frozen storage for examination at a later date.

Three fillets were pressed at one time. The amount of fluid obtained from each fillet was determined by its loss of weight. All of the fish were measured so that fillet size could be coordinated with the amount of expressible fluid.

Exudates from each lot of three fillets were combined and analyzed for total solids and for total and coagulable nitrogen. The total solids were determined, after alcohol had been added to a weighed amount of the expressed fluid (usually about 10 grams), by evaporating the mixture to dryiness on a steam bath. The dry solids obtained were then dried to constant weight in an oven at 105° C. Total nitrogen and trichloracetic acid coagulable nitrogen in the exudate were determined by the Kjeldahl method.

Results.--Estimations of the amount and the composition of the expressible fluid obtained from eviscerated cod iced for various periods of time are summarized in table 1, over. The values presented are mean values with their standard deviations in brackets. Total nitrogen values have been presented in two columns as coagulable nitrogen and non-coagulable nitrogen, the latter was obtained by difference.

Discussion.--According to Cutting, eviscerated whole cod stored on ice will pass out of rigor mortis about 40 hours after death. The rapid increase in the amount of expressible fluid obtained

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 ABSTRACTER: Martin Heerdt

3.231 AUTOMATIC PLATE FREEZER CUTS PRODUCTION COSTS

Anonymous
Food Engineering 28, 113 (February 1956)

Designed to meet demand for economical production of flat, well-formed frozen packages, which stack compactly in retail cabinets, is a new mobile double pressure-plate freezer. Unit's operation eliminates manual labor.

Called Portable, it is the key to a continuous-automatic loading, freezing, and unloading system that offers top efficiency. Insulated freezers are available with 15 to 20 stations per unit, which can be incorporated into any variable floor plan since there is no built-in construction. Per machine, required headroom is about 13 feet, floor space about 7 x 10 feet.

In operation, packages are fed by conveyor from an overwrap machine, then loaded into the freezer by an automatic hydraulic pusher. Double-contact freezing (top and bottom) starts as soon as one station is loaded. Hydraulic pressure is applied when the freezer is full.

After freezing, each station is consecutively unloaded at the rear, while being reloaded at the front. Unit can be stopped at any point along the line, and there is a front control panel which regulates feed and discharge rate.

See photograph, over.

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QUALITY OF SEA-FROZEN COD

FROZEN FISH COOKERY

EXPRESSIBLE FLUID FROM ICED COD

AUTOMATIC PLATE FREEZER

2.19 (Cross Reference: 1.5)

during the 18-to 68-hour period of storage appears to be attributable to the physical changes associated with the gradual resolution of rigor mortis in the fillets. This is a change from a very firm texture, resistant to pressure, to a softer-textured less-resistant condition. The composition of the fluid obtained, however, remained almost constant. The rapid increase in the amount of fluid after 264 and 360 hours in ice possibly occurred as a result of further softening of the texture coupled with slight denaturation of the intracellular proteins.

Table 1

The amount and composition of the expressible fluid of fillets cut from iced cod

Hours in ice	Expressible fluid	Total solids		Coagulable N		Non-coagulable N	
	g./100 g. fish	g./100 g. fluid	g./100 g. fish	mg./100 g. fluid	mg./100 g. fish	mg./100 g. fluid	mg./100 g. fish
18	4.9 (1.1)	8.16 (0.16)	0.41 (0.06)	0.79 (0.03)	0.038 (0.005)	0.40 (0.02)	0.020 (0.004)
40	6.5 (1.2)	7.74 (0.45)	0.52 (0.08)	0.74 (0.06)	0.049 (0.007)	0.39 (0.04)	0.026 (0.004)
68	7.2 (1.0)	8.08 (0.38)	0.58 (0.05)	0.80 (0.09)	0.057 (0.007)	0.38 (0.03)	0.027 (0.002)
168	7.9 (1.1)	7.90 (0.69)	0.62 (0.09)	0.82 (0.09)	0.064 (0.011)	0.33 (0.05)	0.026 (0.005)
264	8.8 (1.4)	7.45 (0.61)	0.67 (0.10)	0.70 (0.06)	0.062 (0.008)	0.37 (0.02)	0.033 (0.004)
360	10.2 (2.1)	6.70 (0.58)	0.71 (0.13)	0.68 (0.07)	0.072 (0.013)	0.30 (0.06)	0.032 (0.008)

Note: Numbers in parentheses give standard deviations.

3.231

2.118 (Cross Reference 3.249)

a few days in ice prior to freezing showed considerable deterioration when frozen and stored for 1 month at -20° F. In contrast, storage at -30° yielded very satisfactory frozen fish in most instances. These findings show that without storage at -30° F. aboard the catching vessel it will be impractical to ice part of the heavier catches for later freezing.

Experiments with pre-rigor frozen fish have shown that 4 out of 13 lots examined after 2 to 12 weeks at -30° F. gave abnormal products. These fish would not take a satisfactory smoke cure and fillets cut from them were rough in appearance. These findings confirm the reports that fish frozen pre-rigor pass through thaw rigor at about -3° F. This transition appears more devastating in effect than normal rigor changes because of the increased quantity of drip that exudes. Handling conditions aboard the vessel, however, do not permit the segregation of the small quantities of fish that may be frozen pre-rigor. Furthermore, objection to these fish would not arise unless they were smoked.

Freezing ungutted fish saves labor. Tests have shown, however, that autolytically decomposed belly walls may result and that fillets cut from thawed ungutted fish are badly stained with blood and have off-flavors when cooked.

The time that the fish were held in ice before freezing had more of an effect upon quality than any other factor. Cod iced for 1 to 3 days and then frozen and stored at -30° F. were of a very satisfactory quality. Fish iced for periods of up to 9 days before freezing showed that as the time in ice increased the overall quality after thawing became progressively poorer. If 6 days in ice is allowed, the thawed fish will be acceptable but will range in quality from excellent to fair. Since sea-frozen fish are sold frozen, it is not possible to distinguish between good and fair quality. Therefore, fish to be frozen at sea should not be held for longer than 3 days in ice.

2.8

The average score and standard error found for each temperature range are presented in table 1.

RESULTS

Table 1 - Relationship Between Palatability Score and Internal Temperature Reached During Baking of Frozen Halibut Steaks

Internal Temperature of Steaks	Palatability Score of Steaks[1/]	Standard Error of Palatability Score
Degree Fahrenheit	Arbitrary Points	Arbitrary Points
a. 130 - 135	20.1	±1.59
b. 145 - 150	26.9	±1.41
c. 155 - 160	27.6	±1.09
d. 170 - 175	25.6	±1.69

1/ Each score is the average of 54 judgments.

Range (a)--130°-135° F.--had the lowest average score, indicating that it was the least satisfactory of the temperature ranges used.

Range (d)--170°-175° F.--had a higher average score than range (a), but the standard error was larger, indicating a marked disagreement among the tasters in their judgment of samples in this temperature range. Tasters who had been found in series I to be influenced largely by flavor graded these samples high, whereas those who had been found more sensitive to texture and juiciness graded them very low.

Ranges (b)--145°-150° F.--and (c)--155°-160° F.--had average scores within 0.7 of a point of each other, but range (c) had a lower standard error. Range (c) also had the highest average score of the four ranges. These facts indicate that there was more general agreement between the tasters on this temperature range than on any of the other three.

3.19 EXTENSION OF FOOD STORAGE LIFE BY IRRADIATION

Proctor, B. E.; Nicherson, J. T. R.; Licciardello, J. J.; Goldblith, S. A.; and Lockhart, E. E.
(Massachusetts Institute of Technology, Cambridge, Massachusetts)
Food Technology 9, 523-527 (November 1955)

Foods irradiated.--Green beans, asparagus, spinach, pork sausage patties, pork sausage links, round and rump steaks, ground beef, and skinless frankfurters were subjected to high-voltage cathode rays to extend their life in storage at 36° to 40° F.

Preparation and packaging.--The vegetables were trimmed or cut, blanched in live steam, cooled in water, drained, packed in quarter pound, unlacquered sardine cans, and hermetically sealed. The seasoned pork sausage patties were packed in 211x011 enameled cans and hermetically sealed; whereas, the seasoned pork sausage links were packed in evacuated tightly sealed saran bags, or in non-evacuated cellophane bags. The round and rump steaks and the ground beef were each packed in 211x011 size enameled cans and hermetically sealed. The frankfurters were packed in double-layered cellophane bags.

Irradiation levels.--All of the foods were subjected to irradiation at levels from $8x10^5$ to $1x10^6$ rep. with a 3 m.e.v. Van de Graaf electrostatic generator on first one face and then the other as they traveled along on a moving belt beneath the cathode ray beam.

Results.--Spinach subjected to $1.5x10^6$ rep., a level sufficient to destroy psychrophilic bacteria, had a higher organoleptic score after a 6-week storage period at 36-40° F. than did the frozen unirradiated control. Asparagus and green beans, in contrast, developed undesirable flavors when irradiated with $1.0x10^6$ rep.

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 ABSTRACTER: Martin Heerdt

3.237 EFFECT OF COOKING OIL QUALITY AND STORAGE CONDITIONS ON THE KEEPING QUALITY OF FROZEN FRIED FISH STICKS

Holston, John A. (Fishery Technological Laboratory, East Boston, Massachusetts)
Commercial Fisheries Review 17, 15 (November 1955)

During the course of research into the factors that affect the quality and storage life of frozen fried fish sticks, studies were made on the effects of using "spent" cooking oil.

Two lots of cod fish sticks were prepared, one in relatively fresh corn oil (free fatty acid content, 0.24 percent by weight) and the other in old, "spent" corn oil (free fatty acid content 2.5 percent). Each lot was then divided into 3 groups and each stored under different conditions.

Table 1, over, shows the results of the studies. No consistent reproducible differences in quality due to differences in storage conditions could be detected by the panel. The packaging was evidently adequate to protect the samples during the conditions used.

The fish sticks fried in fresh oil remained in marketable condition for 8 months, whereas the fish sticks fried in "spent" oil were considered to be of poor and of unmarketable quality after from 2 to 5 months of storage. The very dark, lifeless color and the oily-soggy texture of the coating of the sticks was displeasing to the panel.

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 ABSTRACTER: Kathryn L. Osterhaug

3.234 SOME THERMODYNAMIC PROPERTIES OF FISH AND THEIR EFFECT ON THE RATE OF FREEZING

Long, R. A. K.
Journal of the Science of Food and Agriculture 6, 621-633 (October 1955)

Theoretical analyses and experiments are described which show the considerable variation of thermal conductivity, density and apparent specific heat of fish muscle with temperature. The variation of these properties is found experimentally to introduce a number of interesting phenomena.

A preliminary investigation into the freezing of small packages of fillets by refrigerated air blast indicated: (1) the necessity for precision in thermocouple positioning and uniformity in heat transfer to obtain accurate thermal arrest measurements, (2) the effect of air speed, temperature, and thickness of pack on thermal arrest time, (3) the effect of different conditions on evaporative weight losses, and (4) the edge effects obtained with small packages.

It had been found during this investigation that the initial loading temperature had a significant effect on the thermal arrest time. This phenomenon, whereby an increase in initial temperature affords a reduction in thermal arrest time, is studied in detail. The effect is so marked under certain conditions as to invalidate much experimental work for which initial temperatures were not recorded. The thermal arrest may be reduced by as much as one half under identical plant operating conditions, and an attempt is made to explain this effect.

See illustrations, over.

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 Author's summary

3.236 HOUSEHOLD CONSUMER PREFERENCES FOR BREADED SHRIMP AND BREADED FISHSTICKS, PART I.

Kahn, Richard A. and Stolting, Walter H.
Fish and Wildlife Service Fishery Leaflet 424, 61 pp. (July 1955)

Only about one homemaker in five uses breaded shrimp.

A high percentage of all homemakers trying either cooked or uncooked breaded shrimp become satisfied customers.

The survey suggests that store demonstrations would be effective in market promotion.

Fish sticks are used in less than 40 percent of all American households.

The prospects for expanding the market are favorable.

Most consumers are indifferent about the variety of fish used in making fish sticks.

Neither breaded shrimp nor fish sticks replace directly other fish products. Only a minority of the respondents indicated replacement of other fish products to a lesser degree.

Consumers are well satisfied with the present labeling.

There is a marked preference for the 12-ounce breaded shrimp package. A package of the same size is not generally available for fish sticks although there appears to be a considerable demand for it.

 Author's summary

PRACTICAL IRRADIATION OF MEATS

THERMODYNAMIC PROPERTIES OF FISH

STORAGE OF FISH STICKS

PREFERENCE FOR BREADED SHRIMP

3.234

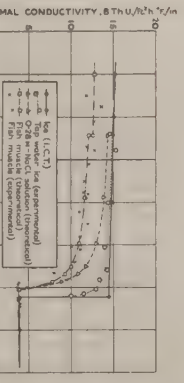

Figure 2.--Thermal conductivity curves

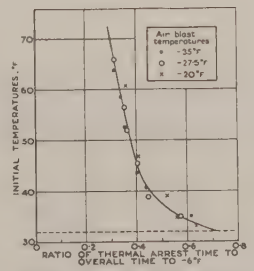

Figure 10.--Ratio of thermal-arrest time to overall freezing-time for different initial temperatures

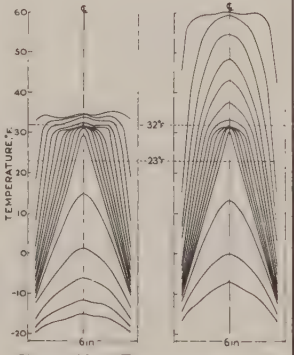

Figure 11.--Temperature distributions at thirty-minute intervals through 6-inch-thick blocks of initial temperature 35° F. and 60° F.

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Fresh pork sausage vacuum packed in saran and irradiated with 1.0×10^6 rep. was edible after 120 days of storage at 36 - 40° F. Fresh pork sausage patties irradiated with 1.0×10^6 rep. packed in hermetically sealed cans and stored for 14 weeks at 36 - 40° F. had better flavor than unirradiated patties similarly packed and stored for 14 weeks at 0° F.

The storage life of ground beef vacuum packed in tin was extended to about 12 weeks at 36 - 40° F. by irradiating it at a dose level 1.0×10^6 rep. Sodium fumarate, 0.3 percent, and monosodium glutamate, 0.5 percent, was necessary as an addition to the ground beef to obviate irradiation off-flavors. Beef that was pumped with a solution of sodium fumarate and monosodium glutamate and then cut into steaks and irradiated, developed an off-flavor.

Microbial spoilage in commercial all-beef frankfurters held at 36 - 40° F. was delayed somewhat by irradiation at a level of 0.25×10^6 rep. Spoilage could be prevented for as long as 3 months at 36 - 40° F. by irradiation at a level of 1.0×10^6 rep., but irradiation off-flavors resulted unless 0.25 percent more of sodium ascorbate was incorporated in the product.

3.237

Table 1 - The Effects of Quality of Cooking Oil and of Storage Conditions on the Storage Life of Frozen Fried Fish Sticks

Lot No.	Frying Oil	Storage Condition 1/	Quality Rating Months 0	2	5	8	12	Probable Storage Life
1	Fresh corn oil, free fatty acid content of 0.24 percent by weight	(A) Mild	Very Good	Good	Good	Fair	Fair	Approximately 8 months
		(B) Extremely Severe	Very Good	Good	Good	Fair	Poor	
		(C) Extremely Mild	Very Good	Good	Good	Fair	Fair	
2	"Spent" corn oil, free fatty acid content of 2.5 percent by weight	(A) Mild	Good	Fair	Poor	Poor	--	Less than 5 months
		(B) Extremely Severe	Good	Good	Fair	Poor	--	
		(C) Extremely Mild	Good	Good	Poor	Poor	--	

1/ Condition (A) - Packages in sealed master cartons directly exposed to continuous air blast (-3° to +2° F.) of 50 feet per minute.
Condition (B) - Individual packages directly exposed to continuous air blast (-10° to 0° F.) of 900 feet per minute. (Air temperature during the 3-times-daily defrost cycle of 15 minutes' duration reached +15° F.)
Condition (C) - Packages in sealed master cartons inside large draft-free box in a still-air cold room (0° to +5° F.).

3.237 CONTINUOUS FRYING-OIL FILTERS CUT COSTS, BOOST Q.C.

Anonymous
Food Engineering 28, 123 (February 1956)

Time and labor consumed in batch filtration of frying oils may be eliminated, and quality control improved, by use of continuous filters. They handle high sediment loads and withstand high-operating temperatures.

Paper and/or rotary screen units make filtration fully automatic, and equipment design offers a clean surface at all times. Filters are permanently connected to the cooker, while a by-pass to storage tank provides for overnight holding, or cleaning.

Easily cleaned units are available in single or two-stage models with capacities from 2 to 800 gallons per minute.

See diagram, over.

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3.249 SMALL STORAGE TEMPERATURE DIFFERENCES CAN AFFECT THE QUALITY OF FROZEN STRAWBERRIES AND GREEN BEANS

Pierce, R. T., Shaw, M. D., Heck, J. G., and Bennet, Grace (Pennsylvania State University, State College, Pennsylvania)
Refrigerating Engineering 63, 52-57 (November 1955)

Studies with a variety of frozen foods have shown that a marked decrease in quality results from storage at +10° F. To learn more about the effect of storage at different temperatures, frozen green beans and frozen strawberries were stored at -3°, 0°, +3°, +6°, +9°, and +12° F. for a period of 10 months. Ascorbic acid determinations and bacterial counts were made on the foods at monthly intervals during storage. Palatability tests were made at the end of the storage period.

Preparation of foods.--Tendergreen variety of green beans from one plot were washed, snipped by hand, cut into 1-inch pieces, blanched for 1.5 minutes at 200° F., cooled in iced water, and packed 150 grams each into polyethylene boxes with tight-fitting polyethylene lids. Temple variety of strawberries from one plot were washed, stemmed and capped, cut in half if large, mixed 6 parts of berries with 1 part of sugar, and the mixture packed 200 grams each into polyethylene boxes with lids. Both foods went into the freezer within 7 hours after the time they were picked and were frozen on trays at about -20° F. The time required for the foods to reach 0° F. was from 2 1/2 to 4 hours.

Methods.--The indophenol-xylene extraction method of Robinson and Stotz was used to determine ascorbic acid in extracts of green beans and strawberries. Malt agar was used to determine the mold count of the strawberries. A yeast extract-beef extract-tryptone agar was used to determine bacteria counts of the strawberries and the beans. Five judges trained in tasting green beans and strawberries were used to score palatability after the frozen beans had been cooked for 7 minutes in boiling water and the strawberries had been thawed for 2 hours at room temperature.

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ABSTRACTER: Martin Heerdt

3.24 DETERIORATIVE CHANGES IN FROZEN SHRIMP AND THEIR INHIBITION

Faulkner, Marian B. and Watts, Betty M. (Department of Food and Nutrition, Florida State University, Tallahassee, Florida)
Food Technology 9, 632-635 (December 1955)

The deteriorative changes which take place in raw and cooked shrimp during freezer storage were investigated, and methods for inhibiting oxidative changes were tested. Under adverse storage conditions (-4° C.) precooked frozen shrimp showed deteriorative changes in color, flavor, and odor after 3 months and texture changes after 6 months. Under better storage conditions (-18° C.), precooked frozen shrimp showed little deterioration after storage up to 10 months. Oxidative changes were inhibited by the use of ascorbic acid, butylated hydroxy anisole (BHA) or liquid smoke flavoring. Ascorbic acid and liquid smoke acted synergistically in inhibiting oxidative changes. "Smoked" shrimp prepared by addition of liquid smoke flavoring to the cooking water were an acceptable product. The addition of ascorbic acid definitely improved the palatability of frozen precooked shrimp after storage periods of 6 to 12 months. Ascorbic acid treatment of frozen raw shrimp showed some evidence of protection after 10 months. In the later experiments the scores of all shrimp after 10 months of storage indicated that a high-quality precooked frozen shrimp product is possible without the use of antioxidants.

Brown spotted (Peneaus duorarum) and white shrimp (P. setiferus) were used and held not more than 5 days in crushed ice prior to freezing. In the treatment of the precooked shrimp before freezing, the various agents were added to the cooking water. In the first tests the shrimp were frozen and stored at -4° C.; in the later series, the shrimp were stored at -18° C. after the first 2 months. Shrimp were judged organoleptically for color, flavor, odor, and texture. A method of colorimetric measurement of the fading of the astaxanthin pigment of the shrimp during storage was used to obtain quantitative data on the degree of oxidation.

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ABSTRACTER: John A. Dassow

3.235 FUTURE OF COOKED AND PREPARED FROZEN FOODS

Anonymous
Quick Frozen Foods 18, 66, 67 (March 1956)

According to Sidney Schwartz, president of the National Prepared Frozen Food Processors Association, "prepared frozen foods of all types account for nearly one-third of the frozen food dollar today, and a rise to 50 percent is inevitable in view of the landslide trend towards convenience foods."

Advantages that these foods provide the homemaker include the following: (1) freedom from cleaning and preparation of food products, (2) saving of time needed for food preparation, (3) freedom from certain food odors, (4) added interest in the diet, and (5) freedom from worry as to cooking success.

Four big factors that should increase the production and sale of cooked and prepared frozen foods in the future are the following: (1) quality control, (2) automation, (3) accelerated advertising, and (4) new packers in the field.

ABSTRACTER: Kathryn L. Osterhaug

CONTINUOUS FRYING-OIL FILTERS

CHANGES IN FROZEN SHRIMP

EFFECT OF STORAGE TEMPERATURE

PRECOOKED FROZEN FOODS

3.24 (Cross Reference: 1.85)

Colorimetric measurement of pigment.--One hundred grams of shrimp were ground and mixed; a 7-gram aliquot was blended with 10 grams Na_2SO_4 and 30 milligrams acetone in a small blender container for 2 minutes. The blend was filtered and made up to 50 milligrams with washings. The absorption of various dilutions of the extracted pigment was measured on a photoelectric colorimeter using a 470 mμ filter. The loss of pigment after 10 months in frozen shrimp treated with various agents is shown in the following table:

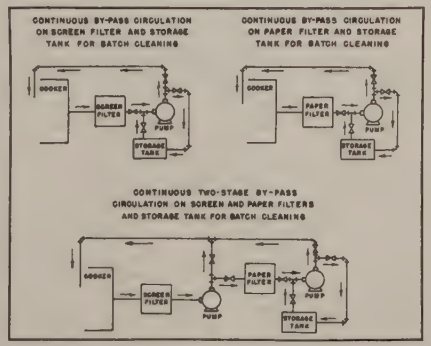
Experiment number	Treatment	%Loss of Pigment
1	Control	20.4
	Ascorbic Acid[1]	
2	Control	36.3
	Ascorbic Acid	25.1
3	Control	25.9
	Ascorbic Acid	1.4
	NaCl (2%)	18.6
	Ascorbic Acid and NaCl	2.6
4	Control	23.8
	Ascorbic Acid	2.7
	BHA (.02%)	16.2
5	Control	40.7
	Ascorbic Acid	26.0
	Smoke (.15%)	24.8
	Ascorbic Acid and Smoke	0.0

[1]Concentration of Ascorbic Acid was 0.1% in all experiments.

The protective effect of ascorbic acid, BHA, and liquid smoke is indicated by the lower percentage of pigment loss as compared to the control for that sample. There was no pro-oxidant effect of sodium chloride demonstrated in these tests.

3.235

3.237



3.249

Results and discussion.--The different storage temperatures had a marked effect on the quality of frozen green beans and frozen strawberries. It is possible that many other frozen foods would respond to storage temperature in the same way. The ascorbic acid content of the beans and strawberries showed a definite decline that became progressively greater with each increase in temperature and time in storage, figure 3, below. Lower storage temperatures resulted in lower bacteria counts; however, these counts were quite low to begin with.

Strawberries stored at +6°, +9°, and +12° F. showed a significant decrease in color. Strawberries stored at +9° and +12° F. showed a significant decrease in flavor, table 4, below. Changes in quality as a result of storage were more readily detected by color than by flavor.

Conclusions.--Greater deterioration of frozen food quality occurs as the storage temperature and the time in storage is increased.

Table 4. Average palatability scores with least significant differences for color and flavor of green beans and strawberries.[a]

	Storage Temperature F						L.S.D.	
	-3	0	+3	+6	+9	+12	.05	.01
Green beans								
Color	4.6	4.6	4.0	3.1	2.3	1.4	0.5	0.6
Flavor	4.6	4.5	4.0	3.1	2.4	1.6	0.6	0.7
Strawberries								
Color	3.9	3.9	3.9	2.9	2.6	1.8	1.0	1.2
Flavor	3.5	3.8	3.6	3.4	2.9	2.6	1.1	1.4

[a]Scoring range 1 to 5, with 5 the optimum score.

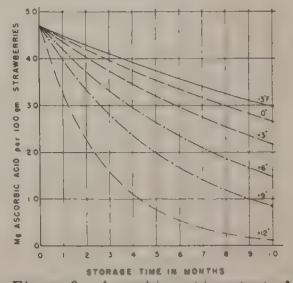


Figure 3. Ascorbic acid content of strawberries when stored at different temperatures for various storage times

3.33 HYDROSTATIC STERILISER IMPROVED

Anonymous
Food Manufacture 30, 468-469 (November 1955)

The plant is called a "hydrostatic" steriliser because it employs a column of water, the height of which exerts a pressure at its base which is equal to the steam pressure within the steam compartment. By using a head of water in this way it is possible to design a "pressure vessel" having no mechanical inlet and outlet valves.

The height of the Hydron varies according to the maximum temperature of operation required--for 240° F. it stands approximately 35 feet high, for 250° F. approximately 45 feet high and covers a floor area about 15 feet square. Working on canned garden peas output ranges from 200-600 cans per minute over a wide range of can sizes.

The twin feed and discharge mechanism operates in synchronisation with the vertical movement of the can carriers. It consists simply of an endless belt running over two large diameter pulleys, the top being the feed level and the bottom (and reverse side) being the discharge level. The moment of feed and discharge is controlled by the can carrier in conjunction with a can interrupter device operated by the main chain.

The can carrier is of the endless type consisting of a series of beams of special section which carry the cans in double rows each row containing about 12-14 cans end to end. These beams, of non-corrosive material, are bolted to twin roller chains operating in a track to convey the cans in a continuous, non-agitating and controlled manner throughout the entire process. With cans 24-28 abreast per double row the chain speed through the machine is reduced to approximately 3.5 feet per minute compared with about 50 feet per minute in a normal single track machine.

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Reprinted in part

3.33 MECHANICAL OYSTER SHUCKER

Anonymous
Southern Fisherman 16, 38, 47 (January 1956)

A mechanical oyster shucker has been developed and a number of them are being constructed for the use of packers of canned oysters along the Gulf Coast.

Steamed oysters are poured into the tumbler drum by a conveyor. Baffles in the drum carry the oysters around as the drum revolves. When the oysters reach the top they fall back to the bottom of the drum and in so doing the meats are shaken loose from the shell. Jets of water wash the meats from the shell and the meats fall through the pipes that form the outside of the drum and are picked up on the conveyor under the drum. The conveyor carries the oyster meats to the flotation tank while the shells are tumbled out the open end of the drum.

At the right is a view of the tumbler taken from the shell exit end.

See other illustrations, over.

(over)

ABSTRACTER: Kathryn L. Osterhaug

3.4 A CONTINUOUS PROCESS FOR SMOKED MEAT. I. DEVELOPMENT OF A PROCESS

Hanley, J. W.; Draudt, H. Ned; and Brockmann, M. C. (Kingan, Inc., Indianapolis, Indiana)
Food Technology 9, 591-597 (December 1955)

The authors analysed batch type smokehouse operation and found that a continuous smoking process would markedly reduce handling expenses. Alternatives to the existing methods for smoking, heating, and drying bacon were then explored. Electrostatic deposition of smoke combined with infrared heating and drying was found to be a feasible method of smoking meat. After studying existing electrostatic smoking equipment, the authors developed a laboratory scale electrostatic smoker, which would impart normal smoke flavor and odor to bacon in 3 minutes.

The essential feature of the laboratory electrostatic smoker is an ionizing section which consists of opposed plates with wire grids. Bacon, maintained at ground potential, is suspended between these ionizing plates.

Smoke is channeled between the ionizing plates, which carry a potential of 40,000 volts, and becomes electrostatically charged. When bacon maintained at ground potential is suspended between the ionizing plates, the charged smoke is drawn to and deposited upon the bacon. Smoke deposition, as measured by the amount of phenolic materials present in the bacon, is influenced by the distance of the wire grids from the ionizer plates, distance of the ionizers from the sample, smoke velocity, smoke density, ionizer voltage, and time. The amount of smoke deposition can be varied by controlling smoke density, ionizer voltage, and time. Relative humidities of 45 and 80 percent did not significantly alter the amount of smoke deposited.

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ABSTRACTER: Martin Heerdt

3.4 A CONTINUOUS PROCESS FOR SMOKED MEATS. II. EQUIPMENT DESIGN AND APPLICATION

Hanley, J. W.; Montgomery, G. L.; Rarick, M. S.; and Brockman, M. C. (Kingan, Inc., Indianapolis, Indiana)
Food Technology 9, 597-601 (December 1955)

The authors have described the features of a commercial size smokehouse for the continuous smoking of meats. This smokehouse consists of 6 infrared heating sections and 1 electrostatic smoking section aligned as a tunnel through which the meat is conveyed.

Operating conditions for smoking various weight classes of cured bellies also have been described. Sliced bacon produced by the continuous smokehouse is virtually indistinguishable from sliced bacon produced in conventional smokehouses. Data obtained during the processing of 7,500 pounds of bacon per day indicate that continuous smoking effects a marked reduction in handling costs in comparison with batch smoking.

A number of other products such as boiled ham, hams and picnics for canning, jowls, Canadian bacon, picnics, ham, and frankfurters have been processed in the continuous smokehouse.

Satisfactory levels of smoke deposition have been observed in every instance. The heating process, however, is not satisfactory for products of irregular thickness. The continuous smokehouse offers a special advantage for products which have been heat processed, such as boiled ham, and products which are subsequently heated by other methods, such as smoked hams for canning. In these products a desirable level of smoke flavor can be obtained with less than 0.5 percent shrinkage.

(over)

ABSTRACTER: Martin Heerdt

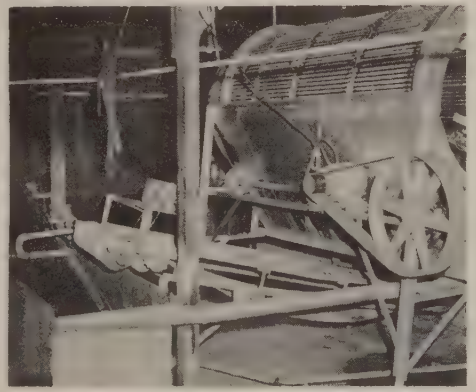
HYDROSTATIC PRESSURE STERILIZER

MECHANICAL OYSTER SHUCKER

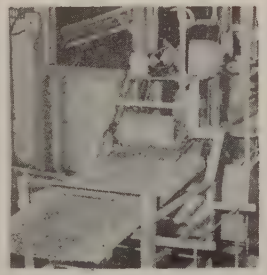
CONTINUOUS ELECTROSTATIC SMOKING

CONTINUOUS ELECTROSTATIC SMOKEHOUSE

3.33 (Cross Reference: 1.81)



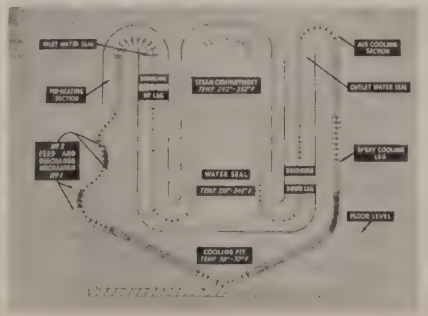
The conveyor and flotation tank with flume at front end.



The grader and brine reservoir tank. Note end of flume extending through partition.

3.33

Action of the Mitchell-Webster hydrostatic sterilizer.--Cans are delivered to the feed mechanism at about 170° F. and enter the pre-heater section where they are heated to about 185° F., before passing to the water seal, the water at this level being at approximately the same temperature. Passing down the bringing-up leg the temperature and pressure progressively increase to the maximum required, i.e., about 240° F. at the water seal. The cans enter the steam compartment without meeting sudden changes in conditions, where they are held for a specified period and pass into the water seal, finally ascending the bringing-down leg to the top of the outlet water seal. A short period of air cooling follows to insure complete pressure reduction within the can. Intermittent spray cooling continues with a further period in a cooling pit after which the cans are discharged at a temperature of approximately 95° to 100° F.



3.4

The continuous smokehouse exhibits no special maintenance or sanitation problems. It is probable that the capital expenditure for a continuous smokehouse of the type here described, is less than that for a conventional smokehouse of equivalent capacity. Other advantages of the continuous smokehouse are flexibility in production schedules and recovery of edible fat drippings prior to smoking.

Electrostatic smoke deposition is exceedingly rapid and can be performed without regard to temperature; therefore, it is of potential interest from the standpoint of meat microbiology.

3.4

Smoke deposited by the electrostatic process tended to smear on the surface of the belly until it was stabilized by a mild heat treatment. Various procedures for heating bellies were examined, and finally a rod-type infrared heating unit was selected. This heating unit was capable of bringing an 8 to 10-pound cured belly to an internal temperature of 120° F. or more within 25 minutes. The weight loss that resulted from heating the cured belly amounted to only three-fourths of that permitted by government regulations.

Cured bellies of the 8 to 10-pound class were processed into bacon in 30 minutes by combining infrared heating and drying with electrostatic smoke deposition. Sliced bacon prepared by this method and evaluated for flavor, odor, frying characteristics, color, color retention, and microbiological and oxidative deterioration was not significantly different from bacon prepared in conventional batch type smokehouses.

Infrared heating units and electrostatic smoke deposition equipment can readily be used as a part of any continuous processing equipment.

4.12 INVESTIGATIONS ON THE UNSATURATED ACIDS OF FISH FAT

Nortevarp, Olav (Chemistry Department, Norwegian Technical University, Trondheim, Norway)
Symposium on cured and frozen fish technology, Swedish Institute for Food Preservation Research, Göteborg, No. 100, Chapter 10, 24 pp. (November 1953)

Herring oil and cod liver oil fatty acids, their sodium salts and methyl esters have been fractionated by low temperature crystallization, solvent extraction and distillation in molecular stills and a spinning band column. Fractions having iodine values up to 427, calc. for acids, and containing more than 90 percent hexaenoic acids have been obtained.

Alkali isomerizations and spectrophotometric examinations of the most unsaturated fractions have given data from which the specific extinction coefficients for the absorption bands of the isomerized hexaenoic acids have been calculated. Based on these values and known coefficients for polyenoic acids of lower unsaturation, formulas have been deduced for calculating the contents of hexa-, penta-, tetra-, tri- and dienoic acids from the extinction coefficients for mixtures of fatty acids or their esters.

The use of said examinations and calculations for fractions of herring oil and cod liver oil fatty acids obtained by the fractionation procedures mentioned, has given results which, contrary to common assumptions, strongly indicate that di- and trienoic acids are present both as C_{16}, C_{18}, and C_{20} acids. For tetraenoic acids the results indicate chain lengths of 18, 20, and 22, for pentaenoic 20 and 22 and for hexaenoic 22.

Extinction coefficients have been determined for herring oil and cod liver oil after isomerization and the percentage of all polyenoic acid groups calculated according to the formulas. Calculations of the contents of monoenoic and saturated acids from the iodine values of the oils and the theoretical iodine value for each polyenoic acid group give values which seem very reasonable, and should indicate that the percentages of polyenoic acids found by the formulas are fairly right.

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Author's summary

4.80 FISH OILS HAVE GREAT FUTURE

Sanford, F. Bruce (Technological Laboratory, U. S. Fish and Wildlife Service, Seattle, Washington)
Southern Fisherman 15, 83-84 (November 1955)

The chemical industry is one of the fastest growing divisions of American business enterprise. For example, Chemical Week (May 21, 1955) indicated that, by 1960, the annual sales of synthetic insecticides would reach $175 million; synthetic detergents, $300 million; synthetic fibers, $2.75 billion, plastics, $3 billion, and industrial chemicals, $16 billion.

These figures indicate that the chemical industry will need vastly more raw material than it has in the past. These data are of great significance for the American fish-oil people. The various fish oils are raw materials having tremendous potential for expanded use in this field, owing to their particular chemical structure and to their present relatively limited use by the chemical industries. In 1953, for example, only $2.28 million dollars worth of fish oils were used in the industries named above, with the major use being in detergents.

Salmon egg oil.--Among the fish oils of interest in Alaska is salmon-egg oil, and it is, accordingly, being studied by the Fishery Products Laboratory at Ketchikan. One of the most important observations made at Ketchikan, which has also

Table 1
Distribution of fatty acids in salmon-egg oil*

Fatty acids	Relative amount
	Percent
C_{14}	1.9
C_{16}	13.4
C_{18}	33.2
C_{20}	31.1
C_{22}	14.7
C_{24}	0.2
Unresolved residue	5.5
Total	100.0

*Oil prepared from pink-salmon eggs collected during the 1954 canning season.

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ABSTRACTER: F. Bruce Sanford

4.62 INHIBITION OF HEMATIN-CATALYZED UNSATURATED FAT OXIDATION

Lew, Yolk T. (University of California, Davis, California)
Master of Science Thesis (September 1955)

The catalytic activity of the hematin compounds toward the different fatty acid esters is similar, but hemoglobin is more active than hemin and hemin more active than cytochrome c. In general, the induction periods of the fat oxidations catalyzed by the individual hematin compounds will increase with a decrease in temperature but they do not follow the Arrhenius plot.

The commercial antioxidants, butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA), nordihydroguaiaretic acid (NDGA), propyl gallate, and alpha tocopherol, when used alone in a lard system containing hemoglobin, give decreasing protection in the order of their appearance. BHT and BHA which were exceptional as antioxidants, were in a different order of effectiveness as synergists depending upon the type and concentration of synergist and antioxidant. Of the five antioxidants only NDGA was synergistic with various levels of histidine. If the commercial antioxidants were used synergistically at different levels with ascorbic acid, all except BHT were effective with 0.001 molar ascorbic acid and 0.0001 molar primary antioxidant. With 0.0001 molar ascorbic acid BHT was effective at the 0.001 level.

Ethylenediamine tetraacetic acid was ineffective synergistically with 0.0001 molar NDGA. Lysine at concentrations ranging from 0.001 molar to 0.04 molar was an effective synergist with 0.0001 molar NDGA. NDGA with BHA or with BTH inhibited a hemoglobin-catalyzed oxidation to indicate an effective synergism between antioxidants.

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ABSTRACTER: Martin Heerdt

4.99 SQUALENE AN ESSENTIAL NUTRIENT?

Anonymous
Nutrition Reviews 13, 348-349 (November 1955)

Squalene in lactation.--Intensive research has indicated that cholesterol may be synthesized entirely from acetate and that squalene is a very probable intermediate in this synthesis. Squalene, however, has been postulated as an essential nutrient for the maintenance of successful lactation in the albino rat. In 1944 and 1950, papers by M. S. El Ridi and M. Shahat and by El Ridi, W. M. Azouz, and A. Abdel Hay reported that rats on a presumably adequate diet were unable to suckle their young. If the oily extract of Foenum graecum seeds or yeast was added to the diet, the ability of the rat mothers to lactate was improved. Squalene, which was characterized by the melting point and by elemental analysis of the hexachloride, was singled out as the active fraction in the oil and the yeast. These findings have been confirmed in several extensive experiments in which diets were supplemented with squalene from shark-liver oil.

Squalene in diets.--Attention has also been drawn to the presence of squalene in all the fats judged adequate for animal diets by H. J. Deuel, E. Movitt, and L. F. Hallman. The question that now arises is how squalene can act as an essential nutrient when it is known to be synthesized in the animal body entirely from acetate.

Function of squalene.--Squalene in the animal organism is believed to function only as an intermediate in cholesterol biosynthesis. Of interest in respect to the function of squalene is a report by J. Raulin, who found that female rats showed poor lactation on a diet with lard as the sole lipid. This diet was similar to a diet used by El Ridi and co-workers. When cholesterol was added to this diet lactation improved. These findings do not designate squalene as an essential nutrient. Rather,

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ABSTRACTER: Martin Heerdt

4.62

Ascorbic acid synergism was limited to ascorbic acid concentrations between 1×10^{-4} and 5×10^{-3} molar when used with 1×10^{-4} molar hemoglobin. If 0.01 molar ascorbic acid was pro-oxidative as a synergist with 0.0001 molar NDGA, then the addition of histidine caused an extended induction period which was highly effective but not as effective as the synergistic combination containing 0.0001 molar NDGA and 0.001 molar ascorbic acid.

The most effective means of inhibiting rancidity was exhibited by a combination of NDGA, BHT, and ascorbic acid, all in concentrations of 1×10^{-4} molar, which was 44.5 times as effective as NDGA alone. A like synergism was found if BHT in the foregoing combination was replaced by BHA.

The above multiple synergist system was very effective as an antioxidant with pork adipose tissue at frozen storage temperatures which indicates it may also be effective for use with meat, fish, and poultry products.

An ascorbic acid cycle and a lipid-peroxide-hematin compound cycle are known to occur simultaneously to increase the oxidation rate if high levels of ascorbic acid are added. With proper concentrations of ascorbic acid the mechanism operates so as to extend the induction period. A mechanism is also postulated for the inhibition of hematin-catalyzed unsaturated lipid oxidation by antioxidant s and other synergists.

4.99

the findings seem to indicate that an animal cannot synthesize all non-essential nutrients in unlimited amounts. Under conditions of stress, in which some normally non-essential nutrient is rapidly used or destroyed, the animals' ability to synthesize this nutrient may become impaired. The nutrient must then be obtained from the diet. The work to date indicates that squalene may be a non-essential nutrient that the animal body cannot synthesize in an adequate amount under stress possibly by reason of its role in cholesterol biosynthesis.

4.12

Table 1
Fatty acids of some marine oils.

		Saturated acids			Unsaturated acids				
		C_{14}	C_{16}	C_{18}	C_{14}	C_{16}	C_{18}	C_{20}	C_{22}
Cod liver oil									
Norwegian	x)	6	8.5	0.5	Trace	20	29	26	10%
						2.3	2.8	6.6	6.9-H
"	xx)	2.0	10.9	1.4	0.2	5.8	28.4	29.4	21.6
					2.0	2.0	2.6	4.6	7.4
Scottish	x)	2	14	1	$^{2}2.0$	$^{10}2.0$	$^{26}3.3$	$^{25}5.5$	$^{20}7.4$
Herring oil	x)	8.3	12.1	0.3	0.5	6.4	21.0	28.3	23.1
					2.0	3.4	4.5	5.5	4.6
Icelandic	x)	7	11.7	0.8	1.2	11.8	19.6	25.9	21.6
					2.0	2.4	3.5	5.2	4.3
Whale oil									
Antarctic	x)	6.3	18.2	2.4	3.7	13.3	38.4	11.4	6.3
					2.0	2.0	2.6	5.6	9.0
South Sea	x)	8.0	12.1	2.3	1.5	15.0	42.4	8.2	10.5
					2.0	2.0	2.4	7.5	9.0

x) From J. A. Lovern: The Comp. of the Depot Fats of Aquatic Animals. F.I. Spec. Rp. No. 51, 1942.

xx) Recent values for oil from lean livers from Lofoten.

4.80

been found at other laboratories, is that salmon-egg-oil fatty acids have, on the average, more carbon atoms per molecule than do the fatty acids of most other oils. Data, for salmon-egg oil, on the relative amounts of the fatty acids of different chain length, calculated according to the best presently available methods, are given in table 1. It is interesting to note that the fatty acids containing 20 and 22 carbon atoms per molecule make up about 46 percent of the total fatty acids present.

In other work at Ketchikan, an attempt has been made to separate the salmon-egg-oil fatty acids into fractions according to the number of double bonds present. The chemists there have now succeeded in separating the fatty acids into three fractions: (1) a fraction containing no double bonds, (2) a fraction containing one and two double bonds, and (3) a fraction containing three or more double bonds.

A convenient method of fatty acid analysis is the determination of "iodine number." Under the conditions used, iodine reacts only with double bonds, so the higher the iodine number, the more double bonds there are. In some of the work done at Ketchikan, fractions were prepared that made up about 60 percent of the total fatty acids present and that had iodine numbers as high as 355.

Since chemical reactions take place readily at double bonds, these results are most encouraging. That is, the research indicates the possibility that the salmon-egg-oil fatty acids can be chemically transformed into an almost infinite number of other compounds of potential value for manufacture into pharmaceutical or industrial products. This possibility is now being actively investigated.

Inasmuch as these fatty acids are present to a considerable extent in other fish oils, many segments of the fish-oil industry should find application for the results of the current research. Thus, the salmon-egg-oil studies may aid in the expansion of the market for fish oils as basic raw materials for use by the rapidly growing chemical industry.

6.10 PROBLEMS IN MARKETING MENHADEN PRODUCTS

Miller, Ted (Wallace Menhaden Products, Inc., Morehead City, North Carolina) and Corbett, Exteen (Nassau Fertilizer and Oil Company, Fernandina, Florida)
Southern Fisherman 16, 91-93 (January 1956) Proceedings 8th Annual Session of the Gulf and Carribbean Fisheries Institute

The principal products manufactured from menhaden are fish meal, fish scrap, fish oil, and fish solubles. Fish meal is clean dried ground tissues of undecomposed whole menhaden with most of the oil removed. Fish scrap is the same material before grinding. Fish oil is recovered from the fish press water either by centrifuging or by a settling method. Condensed solubles is the product obtained by concentrating the press water resulting from the hydraulic extraction of oil from fish. It is approximately 50 percent moisture with a tendency to thicken when cold and has a pronounced fish odor.

Some of the problems in marketing menhaden products arise because (1) seasonal production hampers year-round distribution, (2) variable raw materials and processing conditions prevent complete quality control, (3) unknown growth factors, protein quality and other factors cannot be measured by rapid laboratory methods, and (4) few products make use of the unique characteristics of menhaden.

The menhaden industry increasingly recognizes the importance of working out effective quality control, quality standards, and methods of evaluating its products. An excellent example is fish meal which interests the feed industry because (1) it is a good source of "unknown growth factors" that are necessary for optimum growth and performance in animals, (2) it supplies a high quality protein, (3) it is a good source of the B-complex vitamins, (4) it also adds liberal quantitites of calcium,

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 ABSTRACTER: Kathryn L. Osterhaug

6.193 EFFECTIVE LEVEL OF UNIDENTIFIED FACTORS IN CHICK DIETS SOUGHT

Runnels, T. D. (University of Delaware, Newark, Delaware)
Flour and Feed 56, 26 (August 1955)

The data presented here, along with previously published data, has demonstrated that distillers dried solubles, menhaden fish meal with solubles, and dried cheese whey all contain unidentified growth factors.

These factors appear to be multiple in nature within each feed supplement, but are sufficiently distinctive to produce greater growth when all three were used together than when added singly or in pairs at the levels used.

As previously reported, the most effective level of distillers dried solubles appears to be not greater than 2.5 percent of the diet.

The data reported here has demonstrated that the fish meal with solubles when used at the 5-percent level produced greater gains than lower levels. This data, however, did not demonstrate the optimum level.

The dried cheese whey produced greater gains at the 2.5-percent level than at lower levels, but the level required for optimum gain was not determined.

In formulating practical diets for commercial distribution, the cost of an ingredient must be balanced against its biological value. Under present economic conditions, it appears practical to use

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 Author's summary

6.190 RECENT ADVANCES IN POULTRY NUTRITION

Combs, Gerald F. (University of Maryland, College Park, Maryland)
Feedstuffs 27, 39-40 (November 12, 1955)

Maryland feeding tests.--Results obtained in the 1955 Maryland junior broiler production project showed an improvement of approximately 10 percent in broiler production efficiency. In 1954, 56 flocks of 100 birds each from the broiler area of Maryland averaged 3.29 pounds per bird after 10 weeks of feeding. The average intake of these birds was 2.74 pounds of feed per pound of broiler. In 1955, 63 flocks of 100 birds each averaged 3.27 pounds per bird after 9 weeks of feeding. These birds consumed only 2.5 pounds of feed per pound of broiler. The growers out-of-pocket cost was thereby reduced from 19.7 cents in 1954 to 17.8 cents per pound in 1955. Much of this progress can be attributed to the use of improved feeds.

Other feeding tests.--Other improvements in growth resulting from the feeding of better rations are summarized in table 1, over.

Present day feeds.--Many factors are responsible for the improvement in present day feeds. These factors include readily available vitamin supplements that permit feed manufacturers to add vitamins A, B_{12}, D, E, K, riboflavin, niacin, pantothenic acid, and choline, routinely at relatively low cost. Other substances that have contributed to feed efficiency include antibiotics for growth stimulation and disease control and methionine, which is an amino acid that is now readily available for blending into feeds. Antioxidants now available have made possible the use of added fat at relatively high levels in the formulation of more effecient feed. Unidentified growth factors in fish solubles, distillers dried solubles, and dried whey also have contributed to feed efficiency. Recent studies have revealed than an inorganic growth factor is present in the ash of fish solubles, distillers dried solubles, and dried whey.

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 ABSTRACTER: Martin Heerdt

6.3 IMPORTANCE OF SEAWEEDS

Anonymous
Science 122, 565 (September 23, 1955)

About 130 people from 24 countries registered for the 2nd International Symposium on Seaweeds that was held at Trondheim, Norway, July 14 to 17, 1955. Most of the 40 papers presented (in English) were of a chemical nature. All of the meetings were conducted in English and held at the Norwegian Technical University under the general chairmanship of Trygve Braarud of the University of Oslo. These meetings had been organized by the staff of the Norwegian Institute of Seaweed Research at Trondheim.

Percival (Scotland) described a sulfated polysaccharide isolated from the green algae, Cladophora rupestris that contained L-arabinose, D-galactose, D-xylose, L-rhamnose, and D-glucose in the ratio of 48:38:12:5:3. Linberg (Sweden) described the isolation of a disaccharide, mannitol -β-D-glucopyranoside, and a trisaccharide, mannitol diglucopyranoside, from several brown algae. Methyl inositols (laminitols) isolated from several species of brown seaweeds included D-volemitol as a glucoside from Pelvetia canaliculata, and floridoside α-mannoside from Furcellaria fastigiata.

Smith, O'Neill, and Perlin (Canada) described the fractionation of carrageenin preparations with potassium chloride and with ethanol. In addition, they established one component consisting of D-galactose sulfate at λ-carrageenin and another component consisting of the ester of D-galactose sulfate combined with 3, 6-anhydrogalactose as κ-carrageenin. Other minor fractions containing glucose, xylose, and L.-galactose were also identified. Bayley (Canada) used x-ray diffraction pattern studies of the fibers of κ- and λ-carrageenin to clarify their structural configuration. De Keyser explained the synthesis of alginyl stearate by the action of stearyl chloride on alginic acid

(over)

 ABSTRACTER: Martin Heerdt

6.190 (Cross Reference: 6.193)

Table 1--Recent Improvements in Broiler Rations

Ration	Breed or strain:	Approx. No. broilers	Age in wks.	Average weight lbs.	Feed/unit weight
1953	N.H.* (Source--Md. Misc. Pub. No. 171)	500	10	3.38	2.54
1955	N.H.* (Source--Md. Misc. Pub. No. 237)	2,000	9	3.03	2.37
1955	Lancaster Specials* (Source--Md. Misc. Pub. No. 237)	2,000	9	3.02	2.38
1955	Vantress crossbreds* (Source--Unpublished U. of Md.)	4,000	9	3.03	2.27
1955	Barred Plymouth Rocks* (Source--Slinger, et al., O.A.C.)	129	10	3.59	1.98
1955	N. H. X. Harco Orchard crossbred males (Source--Singsen, et al., U. of Conn.)	24**	8	3.00	2.03
1955	Vantress Red crossbred males (Source--Md. Misc. Pub. No. 226)	20**	7 1/2	2.96	1.72
1955	Vantress Red crossbred males (Source--Md. Misc. Pub. No. 226)	20**	7 1/2	3.01	1.60

* Both sexes. **Groups.

6.3

in pyridine. Alginyl stearate was also shown capable of forming a film suitable for use in the photographic industry.

Haxo and O'Chocha (U.S.A.) who reported on the cultivation and chemical characteristics of the unicellular red alga, Porphyridium cruentum, were able to isolate an extracellular sulfated polysaccharide, which contained glucose, galactose, xylose, and an unidentified uronic acid. The color pigments in Porphyridium cruentum was found to consist of phycoerythrin, phycocyanins, chlorophyll a, β-carotene, zeaxanthin, and probably lutein. Chesters (England) and Yaphe (Canada) presented papers describing bacterial enzymes capable of hydrolyzing laminarin and alginate and agar and carrageenin, respectively. Carrageenase from some marine organisms was found to offer a means of distinguishing between κ- and λ-carrageenins and between agarophytes and carrageenophytes in algal taxonomy. Liaaen and Sörensen (Norway) described the distribution and interconversion of the carotenoids in Fucus vesiculosus and presented evidence for the biological relationship of violaxanthin and zeaxanthin.

The botanical papers presented were concerned with surveys in different part of the world and ecological studies.

6.10 (Cross Reference: 1.20)

phosphorus, and trace minerals to animal feed formulas.

In spite of these known values in fish meal, there is often considerable concern over the variations occurring in the product. The buyer is beginning to insist upon closer tolerance in moisture, protein, and fat content. Care in processing can standardize these factors. On the other hand, there is an impressive list of variables that present a serious problem in attempting to produce uniformly high quality products. These include the effect of species variation, effect of size, condition, and food supply, and effect of processing variables.

Quality standards.--The California Hay, Grain, and Feed Dealers Association has suggested a code that incorporates the following points: (A) uniform grind, light color, and protein content per lot, (B) maximum particle size, (C) moisture, (D) fat, and (E) labeling.

Packing and shipping.--(A) weight (the sack should contain not less than 100 pounds on the standard moisture basis), (B) bag size (to facilitate piling the bags, one size of bag should be used in any given shipment), (C) sterilizing (used bags should be cleaned and sterilized), (D) preventing damage (use "temporary car doors" to protect the bags against damage when car doors are open).

6.193

2.5-percent distillers dried solubles and dried cheese whey in chick starting and broiler diets along with 2.5-percent or more of fish meal with solubles.

Other ingredients are equally as potent in unidentified factors as the ones reported here, and can be substituted for these. Distillers dried solubles, dried cheese whey, and menhaden fish meal with solubles were used in this experiment in preference to other supplements because they are readily available in large commercial quantities.

2.1125 DANISH FISHERMEN MAKE NORTH SEA PAY

Anonymous
World Fishing 5, 22-28 (January 1956)

The Danes are among the most successful fishermen in the world. Esbjerg, on the west coast of Jutland, is their largest and most prosperous fishing port and is one of the most impressive and well organized ports on the continent.

Danish caught flat fish is regarded as a supreme quality product in markets all over the world. Danish skippers agree almost unanimously that the seine net is superior to the trawl as fishing gear because of the better quality of the fish caught. "Quality" is the key word when talking about Esbjerg fishing and accounts to a considerable extent for its emergence as a great continental fishing port.

See photographs, over

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.231 CONTINUOUS FREEZER CAN HANDLE LARGE VOLUME OF PACKAGED MEATS

Anonymous
National Provisioner 134, 17 (February 11, 1956)

A continuous freezing unit was displayed at the National Frozen Food Convention in New York City during November of 1955. Designed originally for the baking industry, the manufacturer expects the freezer to gain wide use in freezing packaged meat, poultry, etc. The unit is able to freeze foods of varying types and sizes simultaneously.

See photographs, over.

In the left photo the entering conveyor is shown at the right side and the discharge-to-storage conveyor at left front. Cutaway portion shows sections of conveyor as it circles freezing tunnel in -30° F. air. Right photo pictures the freezer with walls and roof removed. Conveyor system, banks of freezing coils and fans can be seen.

A 60 x 14 x 11 foot unit of this type could freeze 3,570 small meat pies or 2,390 whole 2 1/4-pound chickens in an hour.

The new automatic freezer can be kept at a uniform temperature of -30° F., or lower if desired, by means of a multistage compression system which refrigerates the freezer's coils to a temperature of -40° F. or below. Six propeller-type fans blow air through vertical banks of coils, and a special air distribution system keeps the temperature uniform throughout the freezing enclosure.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.231 FISH PLANT MECHANIZES TO MEET SALES DEMAND

Anonymous
Quick Frozen Foods 18, 312, 313, 317 (February 1956)

The growing demand for frozen packaged fish and shellfish has caused a Seattle fish plant to mechanize its steak line and speed up the handling procedures.

Under the firm's labels are marketed halibut, salmon, and swordfish steaks in 12- to 16-ounce packages; uncooked 10-ounce salmon, halibut, and swordfish sticks; precooked 8-ounce halibut sticks; 1-pound fillets of cod, perch, sole, haddock, rockfish, flounder, halibut, and salmon; shrimp and crabmeat in 3 1/2-ounce tins and oysters in a 10-ounce tin. The institutional trade is offered, in addition to the above, breaded fillets of halibut and Pacific cod in 2-pound cartons.

A tolerance of 1/2 ounce has been achieved in portion control for the institutional trade. This control was fairly easily achieved with salmon, but was more difficult with halibut. Each breaded fillet is 1/2-inch thick and measures 2 1/2 by 4 3/4 inches. They are packed eight 4-ounce servings per carton and 12 cartons per master case. Each steak is heat sealed in a cellophane bag.

A goal of the frozen packaged fish department is a high level of quality control. The fish for steaking are taken directly from below-zero storage as needed in wheeled bins that are positioned at the primary saws. The fins are trimmed off before the steaks are cut. Halibut steaking is done in two stages, using primary and secondary sawing, whereas salmon is steaked on a single saw.

In the sawing of halibut, the primary sawyer squares the head end of the fish with two cuts, removing the flaps or hugs and the nape. He then adjusts his saw to cut a steak of predetermined thickness and proceeds to remove the slices with the fast-running extra-thin handsaw.

Secondary sawing trims away bony portions and then divides the steak into portions suitable for individual serving.

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 ABSTRACTER: Kathryn L. Osterhaug

3.235 MICROBIOLOGICAL HAZARDS OF PRECOOKED FROZEN FOODS

Straka, Robert P. and Stokes, J. L. (Western Utilization Research Laboratory, Albany, California)
Quick Frozen Foods 18, 182 (February 1956)

The rapid expansion of the precooked frozen food industry has created many production and distribution problems. Among the most critical are those concerned with contamination of the foods by bacteria, yeasts, molds, and actinomycetes.

Mishandled, precooked frozen foods are excellent nutrients for the growth of both disease-producing and spoilage organisms. Production practices and conditions often permit the entrance and growth of microorganisms to a greater extent than is either desirable or necessary.

In some plants a large part of the process still involves hand operations and, in many instances, sanitary provisions are not adequate.

Contamination can be avoided if the nature and extent of the microbial hazards are fully understood and guarded against.

The authors have formulated groups of suggestions to guide the producers, distributors, and retailers of precooked frozen foods:

Guides for producers of precooked frozen foods. --(1) Use only ingredients of good quality. (2) Process the foods under sanitary conditions. This requires that the plant and equipment be kept constantly and scrupulously clean and sanitized with steam, hot water, detergents, and disinfectants. Sanitation among operators is especially important since they can be the distributors of disease-producing bacteria. Human contact with food, therefore, should be kept to a minimum through

(over)

 ABSTRACTER: Kathryn L. Osterhaug

DANISH SEINE FISHERY

FROZEN STEAK LINE

CONTINUOUS FREEZING UNIT

PRECOOKED FROZEN FOOD HAZARDS

3.231

The portion-cut steaks are slipped into a stainless steel dipping tank through which they are carried by a stainless steel wire belt. The tank contains a precooled antioxidant solution.

As the steaks emerge from the tank, the film freezes on the fish, forming a protective glaze. The steaks proceed along the packaging line where they are placed in cartons to a specified weight that makes allowances for the glaze. The filled cartons are placed on a rubber belt and conveyed to an automatic closing and wrapping machine. After overwrapping, the packaged steaks are taken back to the zero rooms for storage.

Frozen steaks are weighed into carton and filled carton placed on a rubber belt conveyor.

3.235 (Cross References: 2.05, 2.3)

mechanization of operations. (3) Maintain low temperatures during the processing operations. Prepare and freeze the foods quickly to retard microbial growth. (4) Obtain the services of a trained bacteriologist to check on sanitary conditions throughout the plant. He will suggest and test methods for eliminating or reducing contamination whenever it occurs.

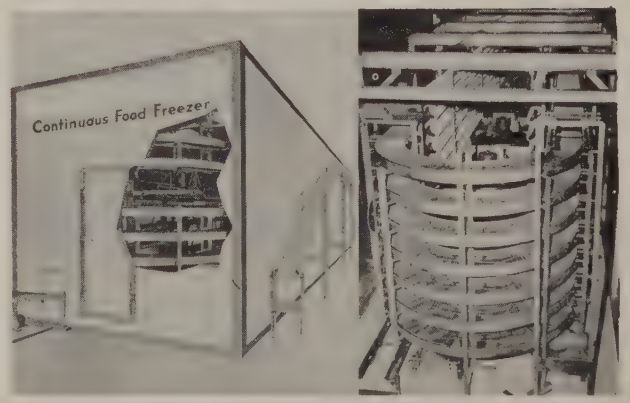
Handling tips for distributors and retailers of precooked frozen foods. --(1) Check all merchandise on arrival for signs of thaw or damage. If either is apparent, notify carrier and packer representative. (2) Rush frozen foods to sub-zero storage. (3) Follow packer's instructions for handling individual packages. (4) Stack merchandise below "safety line" shown on retail display cabinets. (5) Rotate cabinet stocks so older merchandise moves out first. (6) Take reading of cabinet temperatures at morning and night.

2.1125 (Cross Reference: 1.0142)

Typical Esbjerg seiner at sea. Trips last as long as 3 weeks.

The Gunter, only steel fishing vessel at Esbjerg, which goes cod fishing in the Greenland area much of the year.

3.231



0.36 STUDIES ON THE "ARAI" PHENOMENON (THE MUSCLE CONTRACTION CAUSED BY PERFUSING WATER) III. CHANGE IN THE AMOUNT OF A.T.P., FREE SH GROUP IN MUSCLE OF FISH SHORTLY AFTER THE DEATH. IV. ON THE RIGOR MORTIS OF WHITE MEAT FISH AND OF RED MEAT FISH.

Noguchi, Elizaburo and Yamamoto, Jyoji
Bulletin of the Japanese Society of Scientific Fisheries 20, 1020 (1955) (English abstract and tables)

"These compounds in fish muscle decreased very rapidly at 20° C. and reached their minimum values after 9 hours standing of the death where the fishes seemed to enter full-rigor state. If the amount of A.T.P., glycogen and pH value could be maintained in high level when fish were killed on board, rigor mortis might proceed similarly in red and white meat fish."

0.37 DISCUSSION ON THE VARIATION IN THE AMOUNT OF BOUND WATER IN FISH MEAT DURING THE PROCESSING OF MARINE FOOD PRODUCTS

Akiba, Minoru
Bulletin of the Japanese Society of Scientific Fisheries 20, 937 (1955) (English abstract and figures)

0.6 HOW FOOD ULTRASONICS ARE SHAPING UP

Whitney, R. McL.
Food Engineering 27, 80-82, 159-160 (May 1955)

(Abstract of this article appears under 3.19 page 7 - November 1955)

1.1 BIOCHEMICAL STUDIES ON SKIPJACK (KATSUWONUS VAGANS) VI. ORGANIC ACID IN PYLORIC CAECA. VII. DISTRIBUTION OF GUANIDINE COMPOUNDS IN PYLORIC CAECA

Kashiwada, Ken'ichi; Kakimoto, Daiichi; and Kanazawa, Akio
Bulletin of the Japanese Society of Scientific Fisheries 20, 709, 713 (1955)

Four acids were ascertained to be present by paper the partition chromatographic method. Oxalic acid and citric acid were detected along with two other unknown acids.

In the extract of the pyloric caeca stored for one month at -4° C, the following six guanidine compound were found: methyl guanidine, arcaine, agmatine, arginine, octopine and glycocyamine.

1.1 CHEMICAL STUDIES ON THE RED MUSCLE ("CHIAI") OF FISHES. III. COMPARATIVE STUDIES OF AMINO ACID CONTENTS IN THE PROTEIN OF THE ORDINARY AND RED MUSCLE OF FISHES BY MICROBIOLOGICAL ASSAY. IV. PREPARATION OF CRYSTALLINE MYOGLOBIN FROM THE RED MUSCLE OF FISHES. V. PREPARATION OF CYTOCHROME FROM THE RED MUSCLE OF TUNNYFISH (I)

Matsuura, Fumio; Kinosu, Shoji; Ota, Ryozo; Katori, Shinichi; Tanaka, Kiyoe; Yamada, Shigehide; and Hashimoto, Kanehisa
Bulletin of the Japanese Society of Scientific Fisheries 20, 941, 946, 951 (1955) (English abstract, tables, and figures)

"Distribution of amino acids in the muscle protein of these fish seemed to be relatively uniform, irrespectively of species of fish and kind of muscle."

1.80 THE ABSORPTION SPECTRUM OF REDUCED AND OXIDIZED CYPRIDINA LUCIFERIN, ISOLATED BY A NEW METHOD

Tsuji, Frederick I. (Department of Biology, Princeton University, Princeton, New Jersey)
Archives of Biochemistry and Biophysics 59, 452-464 (December 1955)

Luciferin, involved in the luminescence of the marine ostracod crustacea, Cypridina hilgendorfii, was isolated in a chromatographically pure form.

1.85 STUDIES ON MUSCLE OF AQUATIC ANIMALS XXI. ON GLYCINE CONTENT IN EXTRACTIVE OF SHRIMPS, WITH SPECIAL REFERENCE TO THEIR TASTE

Simidu, Wataru and Hujita, Masao
Bulletin of the Japanese Society of Scientific Fisheries 20, 720 (1954) (English summary and table)

"The glycine in the meat extractive of the shrimp seems to be one of the most effective taste stuffs in their muscle."

1.89 ON THE TOUGHNESS OF BOILED SQUID MEAT

Takahashi, Toyo-o and Takei, Makoto
Bulletin of the Japanese Soceity of Scientific Fisheries 20, 1015 (1955) (English summary, figure, and tables)

The breaking strength, breaking elongation, and elongative behavior of the meat cooked in boiling water for 1 hour were found higher than those of the raw meat.

1.89 STUDIES ON THE UTILIZATION OF CUTTLEFISH. I. THE SEASONAL VARIATIONS OF THE WEIGHT AND CONSTITUENT IN THE VARIOUS PARTS OF FISH BODY

Kawata, Hiroshi and Takahashi, Takashi
Bulletin of the Japanese Society of Scientific Fisheries 20, 888 (1955) (English abstract and table)

Investigations were made on cuttlefish (Ommastrephes sloani pacificus) caught from July to December 1951. The oil content of liver was at a maximum and the moisture and nitrogen at a minimum in October and November.

1.89 STUDIES ON THE UTILIZATION OF CUTTLEFISH II. THE DIGESTIBILITY OF CUTTLEFISH MEAL

Kawata, Hiroshi and Takahashi, Takashi
Bulletin of the Japanese Society of Scientific Fisheries 20, 891 (1955) (English abstract and tables)

The digestibility of the cuttlefish meal was found to be far superior to sardine and herring meals, though inferior to codfish meal.

1.89 FATTY ACID CONSTITUENTS OF SQUID OIL

Yamada, Minoru
Bulletin of the Faculty of Fisheries, Hokkaido University 5, 86-93 (May 1954)

(Abstract of this article appears under 4.19 page 9 - June 1955)

1.89 STUDIES ON MUSCLE OF AQUATIC ANIMALS XXII. ON DISTRIBUTION OF EXTRACTIVE NITROGENS AND FREE GLYCINE CONTENT IN SQUIDS

Endo, Kinji; Hujita, Masao; and Simidu, Wataru
Bulletin of the Japanese Society of Scientific Fisheries 20, 723 (1954)

Extractive nitrogens and the free glycine in the muscle of the various kinds of squids have been investigated with special reference to their taste.

1.9 (Cross Reference: 2.00)

STUDIES ON POST MORTEM CHANGES IN THE CHEMICAL CONSTITUTION OF MEAT OF SEA CUCUMBER (STICHOPUS JAPONICUS SELENKA)

Tanikawa, Eiichi, Akiba, Minoru, Ishiko, Hirotoshi, Yoshitani, Setsuko, Motohiro, Terushige; Wakasa, Tetsuro
Bulletin of the Faculty of Fisheries, Hokkaido University 6, 52, 57, 63, 73 (May 1955) (In English)

I. Changes in the Amounts of Lactic Acid and Glycogen in the Meat of Stichopus japonicus During the Period of Rigor Mortis

II. Autolysis of the Meat of Stichopus japonicus

III. The Putrefaction of the Meat of Stichopus japonicus

IV. Determination of the Freshness of the Meat of Stichopus japonicus and the Limit of the Freshness for Use as the Raw Material of Canned Food

1.92 (Cross Reference: 1.0118)

WINTER SMELT FISHING OUT OF ESCANABA, MICHIGAN

Swanson, A. A. (U. S. Fish and Wildlife Service, Ann Arbor, Michigan)
Commercial Fisheries Review 17, 6 (August 1955)

2.01 STUDIES ON PUTREFACTION OF AQUATIC PRODUCTS XVII. CONSIDERATION OF DIFFERENCE IN PUTREFACTION FOR VARIOUS KINDS OF FISH (2) INFLUENCE UPON TENDERNESS OF FLESH

Simidu, Wataru and Hibiki, Sigeyuki
Bulletin of the Japanese Society of Scientific Fisheries 20, 717 (1954) (English summary and figures)

No difference has been found in the processes of putrefaction between the normal fishes and softened ones.

2.03 (Cross Reference: 1.7)

STUDIES IN THE BACTERIOLOGICAL CHEMISTRY OF SHARK MUSCLE SPOILAGE. I. ON THE CHANGES OF UREASE-ACTIVITY AND BACTERIAL FLORA DURING SHARK MUSCLE SPOILAGE

Kimura, Takahisa and Nagao, Kiyoshi (Faculty of Fisheries, Hokkaido University)
Bulletin of the Faculty of Fisheries, Hokkaido University 5, 352 (February 1955)

The change in the urease-activity has close relation to the changes in the bacterial flora. The principal decomposition of urea is caused by bacterial enzyme.

2.08 REFRIGERATED SEA WATER EQUIPMENT FOR FISH STORAGE ON SALMON TROLLERS

Harrison, J. S. M. and Roach, S. W.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 100, 3-5 (October 1954)

(Abstract of this article appears under 2.114 page 5 - May 1955)

2.08 THE PRESERVATION OF "WET" FISH. PART I

Riemann, H. and Bramsnaes, F.
FAO Fisheries Bulletin 7, 49-65 (April-June 1954)

(Abstract of this article appears under 2.01 page 3 - December 1954)

2.110 GATT: GENERAL AGREEMENT ON TARIFFS AND TRADE

Anonymous
Pan American Fisherman 9, 10-11 (July 1955)

(Abstract of this article appears under 1.0112 page 19 - September 1955)

2.111 NETTING AND ITS SECRETS (9)

Jeffs, F. E.
World Fishing 5, 34 (January 1956)

2.111 EFFECT OF REPEATED HEATING ON MECHANICAL PROPERTIES OF VINYLON-LINE NETTING CORDS

Koizumi, Takashi and Isii, Kazumi
Bulletin of the Japanese Society of Scientific Fisheries 20, 959 (1955) (English summary, tables, and figures)

Tensile strength and elongation of each vinylon-line netting cord decrease with the increase of repeated heating, but each of these dimensions will finally reach a constant value.

2.116 AN EXPERIMENTAL STUDY FOR ESTIMATING THE APPROXIMATE AMOUNT OF FISH SHOALS BY ECHO SOUNDING METHOD

Ishida, Masami; Suzuki, Tsuneyoshi; and Sano, Noritatsu
Bulletin of the Faculty of Fisheries, Hokkaido University 5, 362 (February 1955) (English abstract and figures)

2.116 ON A SIMPLE INSTRUMENT, SIOMI-ITO, FOR DETECTING UNDERWATER CURRENT

Kawakami, Tasae and Iitaka, Yunosuke (Fisheries Department, Kyoto University, Maizuru)
Bulletin of the Japanese Society of Scientific Fisheries 20, 962 (1955) (In English)

"Boulder weights are attached to strings of different lengths. Unfavorable violent underwater current can be determined by a glance of the inclination angles of the strings."

2.116 LOOK WHAT'S ON TELEVISION

Newsome, Hal
Southern Fisherman 15, 32-33, 82 (June 1955)

(Abstract of this article appears under 2.12 page 3 - November 1955)

2.14 NIGHT SPOTTING OF SARDINE SCHOOLS BY AIRPLANE SUCCESSFUL

Anonymous
Commercial Fisheries Review 17, 19 (December 1955)

2.14 SKIFFS USED FOR SHRIMP FISHING IN INSIDE WATERS OF GULF OF MEXICO

Denham, S. C.
Commercial Fisheries Review 17, 39-41 (March 1955)

(Abstract of this article appears under 2.115 page 7 - September 1955)

2.14 IT'S THE TEAM SPIRIT THAT COUNTS HERE

Baxter, R. P.
World Fishing 4, 180-182 (May 1955)

(Abstract of this article appears under 9.4 page 3 - September 1955)

2.6 3,000 LIVE KING CRABS HIT SEATTLE ABOARD "TOTEM"

Anonymous
Fishermen's News 11, 1 (June 7, 1955)

(Abstract of this article appears under 1.86 page 19 - August 1955)

2.6 THE INFLUENCE OF THE QUALITY OF THE FISH IN THE FISH PLANT ON THE SUBSEQUENT KEEPING TIME IN RETAIL STORES IN ONTARIO

Castell, C. H.; MacCallum, W. A.; and Power, H. E.
Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 6, 9-13 (December 1954)

(Abstract of this article appears under 2.00 page 1 - April 1955)

2.8 FISH IN GLORY

Anonymous
Gourmet 16, 22 (February 1956)

2.9 STUDIES ON THE RADIOACTIVITY IN CERTAIN PELAGIC FISH.
I. DISTRIBUTION OF RADIOACTIVITY IN VARIOUS TISSUES OF FISH.
II. GROUP SEPARATION OF RADIOACTIVE ELEMENTS IN FISH TISSUES.
III. SEPARATION AND CONFIRMATION OF Zn^{65} IN THE MUSCLE TISSUE OF A SKIPJACK.

Amano, Keishi; Yamada, Kinjiro; Bito, Masamichi; Takase, Akira; Tanaka, Shoji; Tozawa, Harumi
Bulletin of the Japanese Society of Scientific Fisheries 20, 907, 916, 921 (1955) (English abstract, figures, and tables)

In general, liver, kidney, gall bladder, and heart were found as the most contaminated parts in the tissues of the animal. Pyloric caeca, stomach, and intestine were weaker in their radioactivity than the above organs; further the least activity was observed for skin, bone, and muscle. Dark muscle always held much higher radioactivity than white muscle of the same fish.

2.9 STUDIES ON THE RADIOACTIVE MATERIAL IN THE RADIOLOGICALLY CONTAMINATED FISHES CAUGHT AT THE PACIFIC OCEAN IN 1954

Saiki, Masamichi; Okano, Shinji; and Mori, Takajiro
Bulletin of the Japanese Society of Scientific Fisheries 20, 902 (1955) (English abstract, figures, and tables)

The highest concentration of radioactivity was found in viscera with less in bone, skin, and muscle.

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

Analyst
Analytical Chemistry
Archives of Biochemistry and Biophysics
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemistry and Industry
Commercial Fisheries Review
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fisherman
Fishing Gazette
Flour and Feed
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Science Abstracts
Food Technology
Frosted Food Field
Industrial and Engineering Chemistry
Industrial Refrigeration
Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Home Economics
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Meldinger Fra SSF (Herring Industry, Norway)
Modern Packaging
Modern Refrigeration
National Fisherman
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

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Editorial Clerk (Typist)--Betty Anne Brookbank

3.19 EXPERIMENT ON THE ANTISEPSIS OF FOODS BY RADIOACTIVE-RAY III. PRESERVATION OF FOODS BY GAMMA-RADIATION V. PRESERVATION OF FOODS BY GAMMA-RADIATION (2)

Okada, I.; Osakabe, I.; Kikuchi, T.; Fukushima, K.; Yamashita, H.; Sasaki, S.; Hashimoto, K.; Akazuka, M.; and Watanabe, W.
Bulletin of the Japanese Society of Scientific Fisheries 20, 994, 1000 (1955) (English abstract and tables)

Bacteria could be killed when the radiation was carried out at 1 to 3 centimeters from Co^{60} 41 C source for 4 hours (its irradiated dose was ca. 220,000r). The fresh fillet of tuna had a tinge of dark red and an irradiated odor, but not any radioactivity. Certain yeasts and Gram-positive cocci isolated from tunafish fillets were the most tolerable strains for gamma-ray irriadiation of Co^{60}, having a potency of 41C.

3.19 FOOD IRRADIATION. NO BREAKTHROUGH PREDICTED, BUT RADIOPASTEURIZATION SHOWS PROMISE AS FIRST COMMERCIAL APPLICATION

Anonymous
Journal of Agricultural and Food Chemistry 4, 107-108 (February 1956)

In the Michigan tests, smoked fish packaged in polyethylene bags was given a radiation dose of 0.8 to 1 mega-r.e.p. The irradiated fish had a good flavor immediately after treatment, and also after storage at room temperature for one month. After three months at room temperature, a rancid taste developed. Refrigeration may have delayed rancidity for several months.

3.19 AN EVALUATION OF RADIATION SOURCES AS A MEANS FOR PROCESSING FOODS

Evans, Lt. Col. Belmont S., Jr. (Radiation Sterilization Project, Quartermaster Food and Container Institute for the Armed Forces, Chicago, Illinois)
Food Technology 9, 615 (December 1955)

3.230 CONVENIENCE, MENU VERSATILITY SPUR GROWTH OF PEELED AND DEVEINED SHRIMP

Anonymous
Quick Frozen Foods 18, 91 (September 1955)

(Abstract of this article appears under 1.85 page 1 - February 1956)

3.231 FREEZING RATES AND ENERGY REQUIREMENTS FOR FREEZING PACKAGED FISH FILLETS AND FISH STICKS IN A MULTIPLATE-COMPRESSION FREEZER

Slavin, J. W.
Commercial Fisheries Review 17, 21-26 (July 1955)

(Abstract of this article appears under 3.234 page 9 - January 1956)

3.235 WITH EDUCATIONAL PROGRAM AND QUALITY STANDARDS, FROZEN SOUPS COULD ACHIEVE MAJOR VOLUME

Anonymous
Quick Frozen Foods 18, 361, 362 (February 1956)

"Fish soups are far and away the biggest sellers".

3.6 DEHYDRATED PORK STUDIES: REMOVAL OF GLUCOSE BY GLUCOSE-OXIDASE ENZYME

Henrickson, R. I.; Brady, D. E.; Gehrke, C. W.; and Brooks, R. F.
Food Technology 10, 1 (January 1956)

Glucose-oxidase enzyme was used with food grade hydrogen peroxide to prepare dehydrated pork of reduced glucose content. Meat particles of a 1/8-inch grind were best suited for this type of reaction and yielded a finished product with an extended shelf life. Four milliliters of liquid enzyme and 5 ml. of peroxide (30 percent) were added to each 1000 g. of meat. The optimum reaction time was 4 hours at 13° C. (55° F.) Reacting the meat more than 4 hours with the enzyme did not improve its shelf life. Nearly 25 percent more of the glucose was converted to gluconic acid when cooked pork was reacted with the enzyme as compared to that which was uncooked. The taste panel found the enzyme-treated meat superior to the control.

3.239 DETERMINATION OF COOK DRIP IN PACIFIC OCEAN PERCH (SEBASTODES ALUTUS) AND PACIFIC OYSTERS (OSTREA GIGAS) BY USE OF A NEW METHOD

Sumerwell, William N.
Commercial Fisheries Review 17, 18-21 (March 1955)

(Abstract of this article appears under 3.249 page 17 - August 1955)

3.338 CORRECTION FACTORS FOR HEAT PENETRATION THERMOCOUPLES

Ecklund, O. F.
Food Technology 10, 1 (January 1956)

Studies have been conducted to redetermine the errors in heat penetration measurement caused by conduction of heat along thermocouple wires and by the introduction of heat into the product by thermocouple fittings. The work confirms, in general, previously suggested correction factors. However, a new method of making the correction for the error is suggested in which the correction factor is applied to the lag factor "j."

3.64 THE BACTERIOLOGY OF DEHYDRATED FISH. II. THE EFFECT OF STORAGE CONDITIONS ON THE BACTERIAL FLORA

Shewan, J. M.
J. Hyg. 51, 347-358 (1953)
Food Science Abstracts 26, 254 (May 1954)

(Abstract of this article appears under 2.01 page 17 - November 1954)

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4.11 METHANOLYSIS OF TRIGLYCERIDES

Hartman, L. (Fats Research Laboratory, Department of Scientific and Industrial Research, Wellington, New Zealand)
Journal of the American Oil Chemists' Society 33, 129 (March 1956)

Alkali-catalyzed methanolysis of fats as a means of preparing methyl esters for analytical purposes has been investigated. Of the various catalysts employed sodium methoxide and ignited potassium carbonate have been found to set free 99 to 99.5 percent of total glycerol and to cause the least degree of saponification.

4.13 THE ISOLATION OF N-PENTADECANOIC AND N-HEPTADECANOIC ACIDS FROM SHARK (GALEORHINUS AUSTRALIS MACLEAY) LIVER OIL

Morice, Isobel M. and Shorland, F. B.
The Biochemical Journal 61, 453 (November 1955)

From the liver oil of the New Zealand school shark (Galeorhinus australis Macleay) n-pentadecanoic and n-heptadecanoic acids have been isolated in amounts corresponding, respectively, to 0.28 and 0.17 percent of the total fatty acids by the combined process of fractional distillation and crystallization without recourse to hydrogenation.

4.14 21ST ANNUAL REVIEW OF THE LITERATURE ON FATS, OILS, AND DETERGENTS. I.

Piskur, M. M.
The Journal of the American Oil Chemists' Society 32, 255-271 (May 1955)

(Abstract of this article appears under 4.00 page 13 - February 1956)

4.15 COMPONENT FATTY ACIDS AND UNSAPONIFIABLES IN SHARK LIVER OIL

Kamath, G. G. and Magar, N. G. (Department of Biochemistry, Institute of Science, Bombay)

The Journal of the American Oil Chemists' Society 33, 50 (January 1956)

In Waghbeer liver oil, C_{20} and C_{22} acids predominate over the C_{16} and C_{18} acids, whereas in Khada mushi liver oil, C_{18} acids constitute the major portion.

8.64 OCCURRENCE OF CHOLINE IN THE SHELLFISH, CALLISTRA BREVISIPHONATA CARPENTER

Asano, Motokazu
Tohoku Journal of Agricultural Research IV, 239 (March 1954)

Choline in the ovary ranges from 100 to 500 mg. per 100 g. of dry material.

8.64 ANIMAL PROTEIN FACTOR (APF) AND VITAMIN B_{12} IN MARINE PRODUCTS. V. VARIATIONS IN THE VITAMIN B_{12} CONTENT OF MARINE ANIMALS IN THE SPOILAGE (PART 2)

Mori, Takajiro; Hashimoto, Yoshiro; and Maeda, Yasuhiko
Bulletin of the Japanese Society of Scientific Fisheries 20, 604 (English summary and tables)

Aerobic and anaerobic bacteria were isolated from jack mackerel, baby clam, sardine, mackerel-pike and goby meats and their ability to decompose or produce vitamin B_{12} were tested.

8.7 GULF AREA OYSTER CANNERS SET NET-WEIGHT STANDARDS

Anonymous
Commercial Fisheries Review 17, 33 (July 1955)

Can Size	Existing Standard of Drained Weight Per Can Ounces	New Standard of Net Contents Ounces
211 x 300	4.66	8
211 x 400	6.43	11
307 x 113	4.17	7
202 x 204	2.84	5

8.8 SIMULTANEOUS VS. SUCCESSIVE PRESENTATION IN A PAIRED COMPARISON SITUATION

Schwartz, Noel and Pratt, Cornelia H.
Food Research 21, 103-108 (January - February 1956)

The simultaneous presentation yields stronger preferences than does the successive. In addition, the successive paired comparison is vulnerable to the influence of order of presentation, and becomes more so as the interval between samples increases. This phenomenon may be a partial contributor to the lesser preferences obtained with successive presentation, since any non-relevant variable which is operative, yet balanced out, is bound to have a levelling effect upon preference. With simultaneous comparison, on the other hand, order of presentation is eliminated as a contributing variable.

8.8 (Cross Reference: 1.85)

SHRIMP QUALITY CAMPAIGN SHOWS PROGRESS

Anonymous
National Fisherman 36, 12 (August 1955)

Speakers at the Fourth Annual Convention of the Shrimp Association of the Americas, held in Mexico City July 21 - 23, expressed the views that in spite of the progress made during the past year in producing, packing, and marketing better quality fresh frozen shrimp, there is considerable room for improvement. The strict observance of a quality control program at the boat level is essential if industry is to reach its ultimate high shrimp quality objective. Cooperation by many boats have been noted.

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